All tutorial files can also be downloaded from: **www.3dartistonline.com/files**

www.3DArtistonline.com

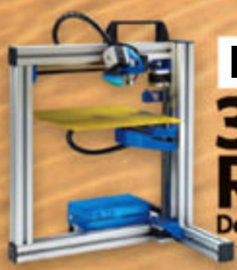
3DArtist™

57

Practical inspiration for the 3D community

MODO 701

Master unique sci-fi imagery using top professional tips



EXCLUSIVE

3D PRINTERS REVIEWED

Desktop printing tech tested: from $800 to $2,400

STYLISED ZBRUSH TECHNIQUES

Create individual results with this innovative step-by-step guide

Race car renders

Go back to basics with our easy-to-follow tuition

SIMULATE CLOTH

Pro VFX tips from the brains at MPC

MPC SPEAKS OUT

Today's biggest VFX vendor reveals its world-class workflow

World War Z

We go behind the scenes of this epic zombie blockbuster

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With the Disc

Free with this issue

- Access a 60-day trial of digital sculpting software 3D-Coat V4

Artist info

Gavriil Afanasyev Klimov

Personal portfolio site
www.hexeract.org

Location USA

Software used
MODO, Photoshop

If you want to try concepting sci-fi imagery using MODO, then turn to page 48. You can also take a sneak peek into the world of the concept artist on page 40, where cover star Gavriil A. Klimov discusses exactly what's demanded of a concept artist working today.

Concept stunning sci-fi page 48

> Concept art is a field that keeps progressing at a very fast speed. Today 3D has taken on a far more prominent role in the field

Gavriil A. Klimov discusses the art of 3D concepts **Page 40**

Let's be honest, science fiction is absolutely awesome. From the dark dystopian sets of *Blade Runner* to the glorious otherworldly vistas of *Avatar*, it's a genre that has supplied us with some of the greatest and most imaginative imagery ever witnessed in the entertainment medium. It's thanks to concept artists like Gavriil Afanasyev Klimov, of course, who just so happens to be our cover star this month. His awesome *Unit 06-T9* image is exemplary of the kind of hard-edged, unique sci-fi that concept artists come up with on a day-to-day basis. To learn more about the craft of 3D concept art, turn to our artist interview on page 40. To try out the workflow yourself, head to page 48.

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Welcome

to the magazine and 116 pages of amazing 3D

Every issue you can count on...

1. **Exclusively commissioned art**
2. Behind-the-scenes guides to images and fantastic artwork
3. **A CD packed full of creative goodness**
4. Interviews with inspirational artists
5. **Tips for studying 3D or getting work in the industry**
6. The chance to see your art in the mag!

Hello and welcome to 3D Artist magazine! The incredibly detailed mech you see on the cover of this fine issue is the creation of Gavriil Afanasyev Klimov, senior concept artist over at *Metal Gear Solid* creator Kojima Productions. On page 48 he reveals his workflow for concepting unique sci-fi creations in both videogames and film.

This issue we've also gone behind closed doors at MPC to bring you a revelatory peek at the workflow of the visual effects elite – a must-read for any budding VFX artist! Following that we take a look at the making of MPC's latest show, *World War Z*. It's a cracking issue, we must say. So let's get going!

Chris

This issue's team of expert artists...

Gustavo Åhlén

Gustavo's done not one, but two tutorials this issue! Turn to pages 72 and 88 for his anatomy and top FX tips

Mathieu Assemat

Mathieu is no less than MPC's lead technical animator, so he knows his stuff when it comes to nCloth simulations

Marcello Baldari

If you want to try something a little different with ZBrush, then you definitely need to check out this polysketching tuition

Craig A Clark

This issue Craig puts his LightWave skills to the test to create an energetic race car image in our Back To Basics tutorial

Ben Cooper

In this Q&A, DreamVision's Ben Cooper discusses how to achieve an ambient occlusion pass in LightWave

Elizabeth Gallagher

Elizabeth from texturesrus.net shows how to create seamless textures from complex source imagery. Great work!

Lilit Hayrapetyan

Psyop art director Lilit reveals her approach to abstract holographic designs in 3ds Max and V-Ray in this useful tutorial

Gavriil Afanasyev Klimov

As he's the senior concept designer at Kojima Productions, Gavriil knows a thing or two when it comes to shiny sci-fi design

Joe Nazzaro

Joe speaks to some of the top VFX artists out there in this in-depth feature on the VFX-packed flick *World War Z*

Pierre Rogers

3D-Coat fanatic Pierre gets stuck into the latest version of the digital sculpting software and reveals his finds

David Scarborough

Ever wanted to know what goes on behind the doors of MPC? David reveals all in this revelatory MPC pipeline breakdown

Paul Sutton

Following its latest release, we asked Poser pro Paul Sutton to put the software to the test. Head to page 97 to see the results

Sign up, share your art and chat to other artists at www.3dartistonline.com

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The professional pipeline

"At this level, people want to be the best effects artists they can possibly be"

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Discover Marcello Baldari's polysketch technique

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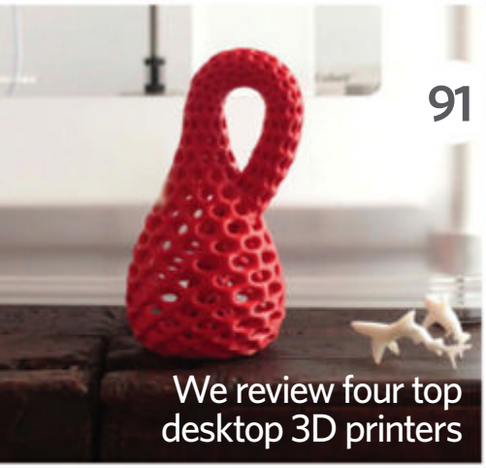

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We review four top desktop 3D printers

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“The cool idea that got everyone excited was that there would be a sea of zombies, more than you'd ever seen before”

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Turn to page 112 for the complete list of the disc's contents

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WELCOME TO

THE GALLERY

Seven pages of great artwork from the 3D community

Images we love!

3DArtist Loves

"This is an amazing take on the dragonflies witnessed in the original advert, boasting a combination of delicacy and grace that takes real CG mastery to achieve"

Chris Deputy Editor

Artist info

Eduard Zhikharev

Originally from Moscow, Eduard now works as lead motion artist at Transparent House

Personal portfolio site
www.zhikharev.pro

Country USA

Software used 3ds Max, V-Ray, Photoshop, ZBrush

Work in progress...

"These images are part of an amazing project, Blazing Dragonfly Vodka, by Transparent House, where I worked as a render artist within the creative team at the company. Here we wanted to make our character look like a 3D printed model standing on a table"

Eduard Zhikharev, *Blazing Dragonfly,* 2012 © Transparent House

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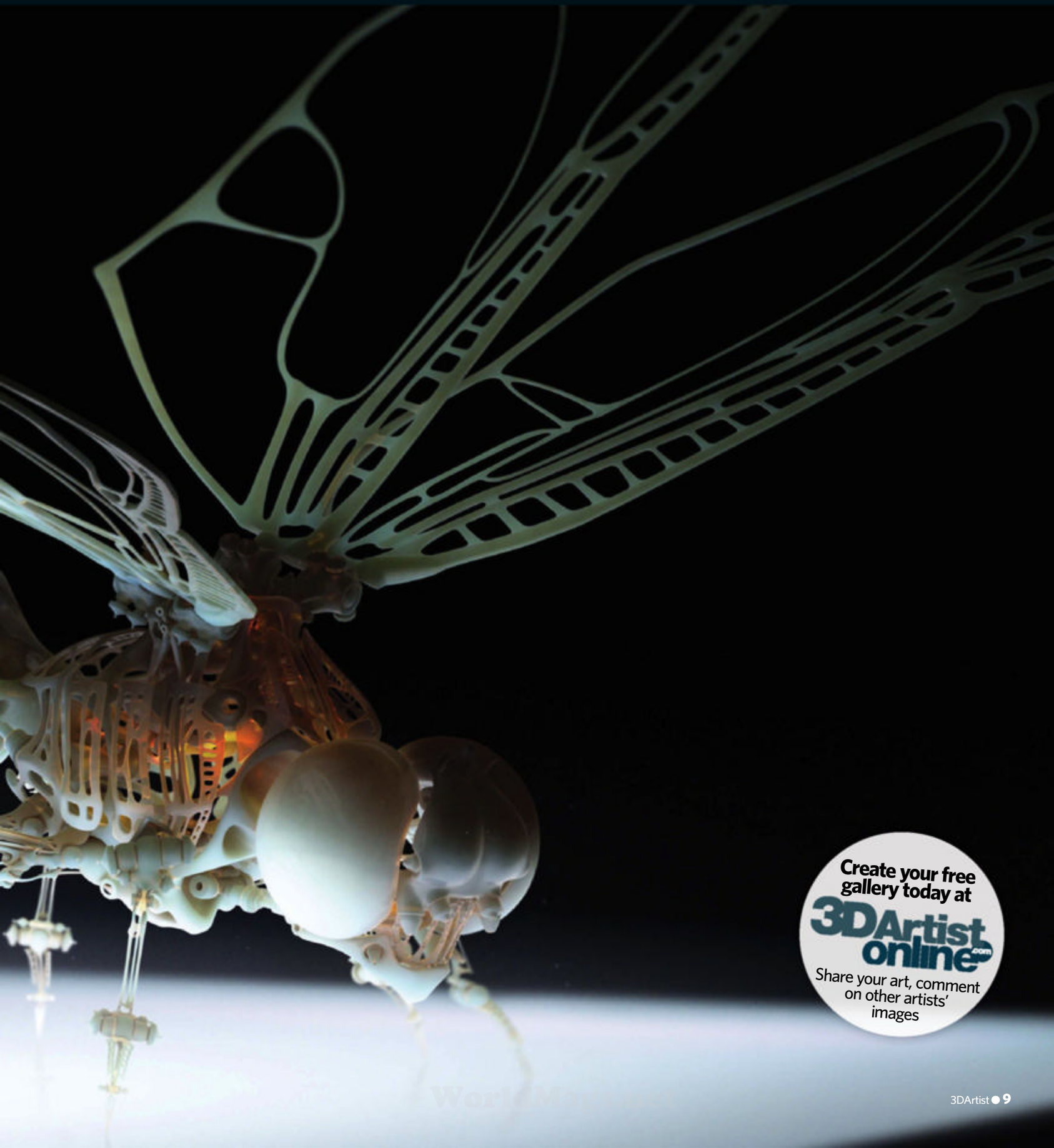

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3DArtist Loves

"It's hard not to love the detailed sculpting and design that went into this cheerful character – his three arms look totally natural!"
Larissa Staff Writer

Artist info

David Domingo Jiménez

3DArtist online
Username: ddjimenez

Personal portfolio site
www.ddjimenez.blogspot.com.es

Country Spain

Software used 3ds Max, ZBrush, V-Ray, Photoshop, UVLayout

Work in progress...

3DArtist Loves

I'm a big fan of Adam's work and the way he experiments with the human figure. His use of contrast with the fragmented mesh make this an intriguing piece

Larissa Staff Writer

This was created during experiments fragmenting a 3D model of a body using several different kinds of topology. I chose a way that seemed to have an interesting effect and painted the pieces in three different colours to present a story

Adam Martinakis, *Fatal*, 2013

Artist info

Adam Martinakis

Adam has been working and experimenting with CG and visual media for 13 years

Personal portfolio site www.adamakis.blogspot.co.uk

Country UK

Software used 3ds Max, ZBrush, DAZ3D, V-Ray

Work in progress...

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> Beyond the year 3,000, Earth is being devastated by radioactive tides and gamma ray storms. Life on Earth's crust is almost impossible. Humankind is now living in big cities deep under the ground and their energy dependence is high

Francesc Camós, David Munoz Velazquez, *The Weathermen*, 2013

3DArtist Loves

This is an incredibly atmospheric image, bursting with a sense of deeper narrative only half-glimpsed through these characters

Chris Deputy Editor

Artist info

Francesc Camós, David Munoz Velazquez

3DArtist online

Username: fcamos, munozvelazquez

Personal portfolio site www.craftfranship.weebly.com, www.munozvelazquez.com

Country Spain

Software used ZBrush, 3ds Max, Softimage, UVLayout

Work in progress...

WorldMags.net

3DArtist Loves

"We love imaginative creature designs like this, particularly when they make such fantastic use of lighting"

Chris Deputy Editor

Artist info

Nuttavut Baiphowongse

3DArtist online
Username: Gibbon

Personal portfolio site
www.baizilla.blogspot.com

Country Thailand

Software used
ZBrush, KeyShot, Photoshop

Work in progress...

"I created this creature in the Thai Animator Festival 2 for On One Animation School. I started without a concept in my head. I was originally working towards some kind of sea creature but ended up with an insect humanoid. It's always fun to make creatures" **Nuttavut Baiphowongse,** *Formicidaeman*, 2013

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> This is a continuation from the idea behind my previous work *Mysterious Sculpture*. I created the modelling, texturing and rendering in ZBrush, with only the composition completed in Photoshop
>
> **Tomasz Strzalkowski,** *Mysterious Sculpture2*, 2013

3DArtist Loves

> This is an great example of how much can be achieved with a single piece of software. The organic shapes of the clothing create an atmospheric result
>
> **Larissa** Staff Writer

Artist info

Tomasz Strzalkowski

3DArtist online

Username: Tomstrzal

Personal portfolio site
www.tomstrzal.com

Country Poland

Software used
ZBrush, Photoshop

Work in progress...

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Winner of Student of the Year Pramod L J describes his Cubism project as his most challenging

Chris John Debski

Victor Gaza

Mike Hong

Cindy Jang

Siran Liu

Maria Esther Lopez Rodriguez

Pramod L J

Niels Prayer

Karen Stanley

Ellen Su

The 3D Artist CG Student Awards

We catch up with the winners of the 3D Artist CG Student Awards to talk about their work, what it felt like to win and their plans for the future

After having been hand picked by high profile industry judges from studios such as Pixar, Weta Digital, MPC, Dreamworks, Ubisoft and The Mill, the winners of the CG Student Awards represent the most voted for in creative skills, technical skills, raw talent and future potential out of 326 entries worldwide.

"Honestly I feel that there were many entries that deserved to win. They were all awesome," says Pramod L J, a Digital Effects MA graduate at Bournemouth University's NCCA. Pramod's VFX work in Houdini and Nuke for the VFX/Animation category won him one of the two Student of the Year 2013 awards.

Specialising in effects and dynamics with aims of becoming an FX TD in the future, Pramod advises VFX beginners to remember that you can create great looking visuals using surprisingly simple techniques. For the most challenging project on his showreel, 'Cubism', the goal was to simulate the creation of a structure out of CG cubes. "After trying out several methods that weren't successful, I found the simple solution was to reverse the simulation," says Pramod, who chose to create a car for the

A render image from Esther Lopez's project Macro, which was inspired by macro photography

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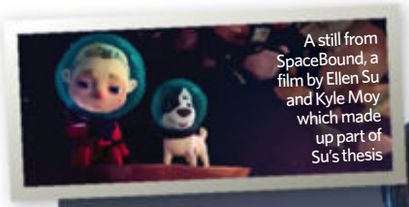
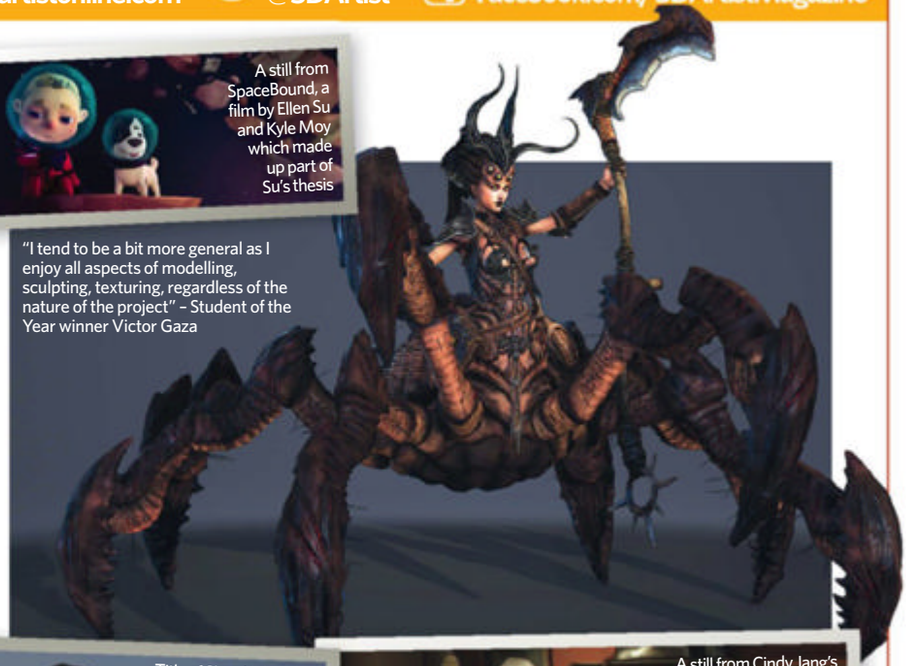

A still from SpaceBound, a film by Ellen Su and Kyle Moy which made up part of Su's thesis


"I tend to be a bit more general as I enjoy all aspects of modelling, sculpting, texturing, regardless of the nature of the project" – Student of the Year winner Victor Gaza

> "Just after entering the competition, I looked at others entries and thought 'What have I done!?'"
>
> **Chris John Debski** Platige academy graduate and internship winner

project. "The car was first modelled out of cubes, then the cubes were simulated to roll out of their position in a sequence and go in different directions. The entire simulation was then cached out and played in reverse to look like the cubes where coming together and forming the structure."

Student of the Year winner for the Next-Gen Gaming category was Victor Gaza, 3D Games Art Masters at the University of Hertfordshire. Gaza uses a range of software such as ZBrush, Maya, Photoshop, xNormal, TopoGun and BodyPaint to create the game characters, creatures and props that form the body of his work. "I used to be a very passionate gamer, and wanted to keep that passion, but take it further," Gaza explains. "Ideally I'd like to be a character or creature artist in an AAA games studio, working with next generation tools and surrounded by amazing artists that make me feel tiny." Gaza goes on to say that his daily aim when creating his work was to wake up early and not procrastinate. "It all comes down to self discipline – if you can make yourself sit down for hours a day and work, then you're set." As for his prizes, which for the Student of the Year winners include Houdini, ZBrush 4R5, NUKE, MARI, an online course from CGWorkshops and a 13-month subscription to 3D Artist among many others, they will be put to good use. "I cannot express how grateful I am," Gaza said.

Runner-up winner for the same category was another student studying Games Art at Hertfordshire and housemate of the winner, second year student Karen Stanley. "It's quite a happy household at the moment," says Karen. Her speciality, creating real time environments and props, developed through her love of having people explore and interact with the places she created. "The lecturers are so passionate about what they do and it filters across to us students," she explains. "They push us to work hard and it's certainly not easy, but it pays off." Cindy Jang, runner-up winner for the VFX/Animation category, says she was inspired by Pixar's Ratatouille to create her work. A recent graduate of Vancouver Film School, Cindy designed the whole kitchen for her showreel herself, using Maya to build the models and complete the UV unwrapping before moving on to Mudbox and Photoshop for texturing. "My advice for future students applying to next year's competition is to try not to be afraid to put yourself out there," she says. "It's not always easy being judged, but I feel that getting your work seen and building confidence in oneself is an essential learning experience."

Title of Siran Liu's group project, Sleddin, which won best student project runner-up in the 2013 Siggraph CAF

A still from Cindy Jang's project, Tortiglioni. Cindy designed the kitchen to appear authentically rustic

Recent Vancouver Film School graduate Esther Lopez, along with Chris John Debski, Cindy Jang, Ellen Su, Manar al Tawam, Mike Hong, Niels Prayer and Siran Liu were the contestants selected as winners of world-class studio internships this summer. "It feels good to be recognised for your work!" Lopez said. "If someone had told me I would have been a winner when I first started the school, I would have laughed out loud."

"I think the most important thing is to show images created with a lot of passion," explains internship winner Niels Prayer, who graduated from Georges Méliès School. "When someone has taken pleasure in working on an image we can always see it in the final result!"

"In my opinion, 3D is a very technical field, so my advice is don't be afraid to face a problem. Eventually you will solve it" – Mike Hong

"My inspiration comes from film and music. I always try to show my perspective or approach the subject in a new way" – Chris John Debski

The first step towards a career

Winners Ellen Su and Sirian Liu discuss their upcoming internships at top CG studios

Ellen Su, recent graduate from the Computer Art department at the School of Visual Arts in New York, is excited to begin her internship at The Mill this summer. "When I was working on SpaceBound, one of the pieces for my thesis, my partner and I were inspired by Galactic Mail, a short produced at The Mill," she said. Texas A&M graduate Sirian Liu is also looking forward to the experience. "I'm really excited to begin the internship because the very first step into the real industry is huge to a student like me." Liu's group project, 'Sleddin', went on to win the Best Student Project Runner-Up prize in the 2013 Siggraph Computer Animation Festival.

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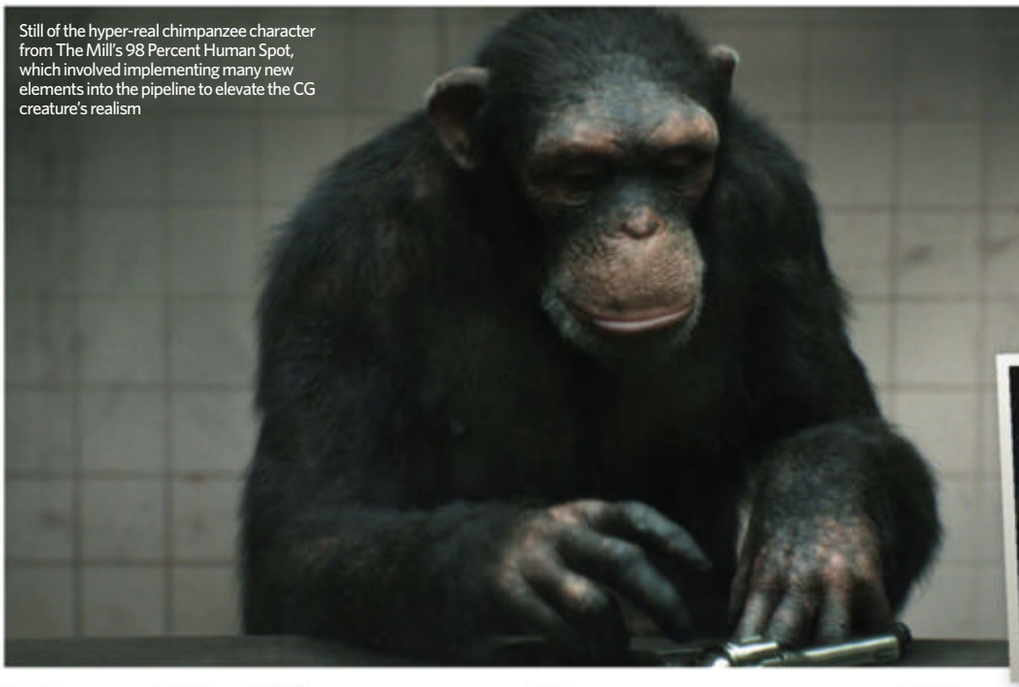

Still of the hyper-real chimpanzee character from The Mill's 98 Percent Human Spot, which involved implementing many new elements into the pipeline to elevate the CG creature's realism

Executive creative director Angus Kneale with the actor used for the pre-vis work on animating the chimp

Realistic creature creation

In The Mill's new spot for PETA, everything from the pores to the bloodstream was created for a CG chimpanzee. We spoke to head of CG Vince Baertsoen to learn more

The Mill www.themill.com

In a bid to stop primates being used within the entertainment industries as actors, The Mill+ collaborated with BBDO NY and PETA to create their astonishing new spot, 98% Human. Ground-breaking levels of detail went into creating the photo-real CG chimpanzee character for the ad. Head of CG at The Mill in New York, Vince Baertsoen, told us more...

What types of software were used to create the project?

We mainly used Softimage, and we were compositing our renders in NUKE. It took approximately three to four months to develop the tools and produce the spot. We were writing tools two weeks before delivery, so we had to work both R&D and production simultaneously.

Could you tell us more about the R&D work behind the project?

I developed the muscle system in parallel with one of our TDs who focused on the skin. All created in Softimage's ICE, each of our muscles was just a model with very generic parameters, which allowed us to get any shape possible and control its dynamics. The skin was a customised Verlet deformer: it was fast and gave us a good result in terms of the skin tension.

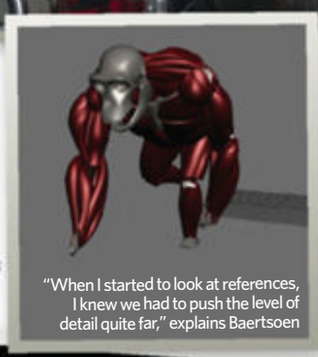
The bloodstream was supposed to help the chimpanzee feel warmer and alive. A pulse from the heart was travelling through the body toward each extremity: the hands, feet, and head. In combination with the pulse, we were analysing the potential volume of blood between the skin and the internal parts of the chimp: the muscles and skeleton. We then used the resulting ICE attribute in a custom frame buffer layer to control the colouration of the chimp's skin in NUKE.

For the pores it was quite straightforward. As we were already getting the position of the roots for each hair follicle and had already done a render map on skin UVs, we used these root positions as a bump map. This helped connect all the elements of the skin and hair together simply and efficiently.

How did you approach the animation?

The animation was really challenging. If we were off by a key frame, or you had half a blink of an eye missing, the emotion would be gone. It had to be so precise. We really pushed our animators and the sensibilities of our team quite far.

To be honest, we were expecting the Uncanny Valley effect, and we knew we couldn't afford to get stuck in it. To tackle that the only way was just to make sure we didn't lose focus and to keep our goals clear and simple. That's why we had our references around us constantly. We knew we would never be done until we could not tell the difference between our renders and those references.


"When I started to look at references, I knew we had to push the level of detail quite far," explains Baertsoen

> "It is the details and imperfections which make CG believable" **Vince Baertsoen The Mill, NY**

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3D printed jewellery

Mark Bloomfield talks us through his 3D printed accessories business Electrobloom

Mark Bloomfield www.electrobloom.com

While working as a jewellery designer Mark Bloomfield used 3D printing extensively as a prototyping process before wondering whether it could be used to create high-quality end products. This was the initial inspiration behind Electrobloom, a jewellery and interior products company offering customers a range of customisable products, all completely 3D printed. Bloomfield aims to pioneer an alternative to mass production using 3D printing with his bespoke hand-dyed designs. "Design isn't fixed any more and 3D printing allows ideas to continually evolve," Bloomfield explains, telling us that using the SLS printing process to manufacture his Blender created designs has allowed him to be highly responsive to what customers want. Bloomfield has a continuous range of new ideas for Electrobloom, and has recently begun exploring metal SLS printing to introduce metal components, including gold, into future jewellery collections. "There has never been a better time to get into realising your own product ideas using 3D printing", he tells us, "and if you have 3D modelling skills then you're already halfway there."

Post-processing work required

"It's worth remembering that no object comes out of a 3D printer that's ready to go," says Bloomfield. The SLS process produces a block of powder containing his 3D object inside, which is removed by using compressed air. Bloomfield then goes over every piece with a brush to remove any remaining traces of powder. He also uses a vibro-finishing machine to give pieces a smooth finish.

Bloomfield is mostly inspired by studying plants, flowers and natural forms, using a floral theme to help guide his idea development

Sculpting the complex folds of cloth and drapery is ZBrush work at its most challenging

Sculpting drapery

Sculptor Steven Lord discusses realistic 3D drapery in ZBrush

Steven Lord www.slor.cghub.com

"It is important for me to push the envelope of digital drapery sculpting and to show what can be achieved without cloth programs or scans," begins Steven Lord. His latest project, 'anatomy of a dunk', is a ZBrush sculpt of a basketball player in motion, with every fold of his clothing created completely from scratch. Lord explains that dynamic drapery, particularly with athletes such as the basketball player, is some of the toughest to sculpt entirely by hand. "When the player leaps in the air there is no gravity and the laws of draping go out the window," he explains. Steven Lord is currently working with ZBrushWorkshops to create in-depth classes about ways to achieve believable drapery in ZBrush. He previously taught the Dynamic Figure Sculpting ZBrushWorkshops class.

The skills required to hand-sculpt draped cloth

"I first block in the major shapes and outline, then define the direction of the folds and rework it until it feels right," Lord says, telling us that knowledge of anatomy, clothing, and rhythm were absolutely crucial to be able to sculpt his basketball player's draping cloth by hand.

ALL ABOUT HISTORY
THE LAST DAY OF LINCOLN
REVOLUTION!
50 EVENTS THAT CHANGED THE WORLD
Ancient Greece to 9/11 - history's gamechangers revealed
"The president seized his throat"
Grigori Rasputin

Expect revelatory articles on subjects such as ancient Rome – all is not always as it seems

All About History: The past as you've never seen it before

The new magazine launch from Imagine Publishing is set to revolutionise everything you know about the past

Imagine has announced the launch of All About History, a new magazine packed with engaging historical content.

Created by the same team behind worldwide smash hits How It Works and All About Space, All About History will adopt a similar format of accessible, visually engaging content that entertains as much as it informs.

The vast generations stretching out behind us are packed with inspiration for any 3D Artist looking for an exciting subject to tackle. We've seen the Holy Ages recreated as CG playgrounds in Assassin's Creed; the visuals by ILM have transported us to the battlefields of WWII in Saving Private Ryan; and we've even had a glimpse of the prehistoric era as witnessed in the VFX of 10,000 BC. All About History will cover these eras and more, providing stimulation and vision for all sorts of future projects.

With its engrossing tone and stunning presentation, All About History is truly an exciting read for anyone with an inquisitive mind. The magazine launches alongside digital editions available from **greatdigitalmags.com**. It's also accompanied by a brand new companion website, **historyanswers.co.uk**. Be sure to check out the Twitter @AboutHistoryMag and the Facebook at facebook.com/AllAboutHistory.

The first issue takes an in-depth look at revolution throughout the ages

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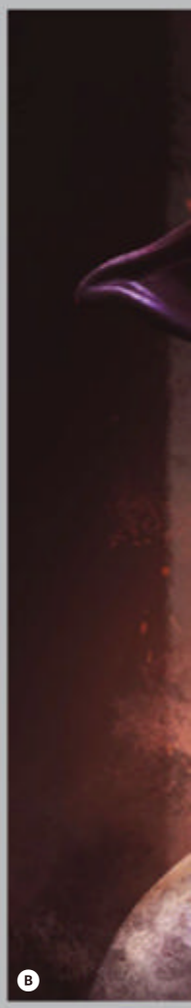

Images of the month

These are the illustrations that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

Share your art
Register with us today at
3DArtist online .com
www.3dartistonline.com
to view the art and chat to the artists

A Row House
» **Square One Media Solutions**
3DA username squareone
Square One Media Solutions says: "Monsoons in Lonavala (a hillstation near Mumbai-Pune highway, India) are a fantasy. As the sun sets here and clouds hover over, nature weaves a romantic quilt. Nestled in nature's such beautiful poetry, this home is visually enticing and a perfect ode to peace and relaxation (commissioned work, Architect – Onus Design, Pune)."
We say: *This is indeed a beautiful arch-vis image, capturing the beauty of the setting as well as the architectural creativity of the building.*

B Moody Conrad
» **Henning Sanden**
3DA username henningsanden
Henning says: "This was a fun character project created in MODO, ZBrush, MARI and Photoshop."
We say: *Here at 3D Artist there are few things we enjoy more than a well-sculpted character, and this one fits the bill perfectly. Everything works together for a great result, from the framing, to the detailed drool on his teeth, to the captivating expression. This is truly a worthy winner of Image of the Month!*

C Fly Under the Electron Scanning Microscope
» **Léandre Dodzi Hounnaké**
3DA username HLeandre
Léandre says: "The biggest challenge in creating this image was getting the fly to look realistic and natural. I really enjoyed the texturing process. I used 3ds Max, Mudbox, V-Ray and Photoshop."
We say: *This is a truly original piece that stands out. We've never seen someone attempt something like this before and it works brilliantly!*

D Fight
» **Eugene Gittsigrat**
3DA username gittsigrat
Eugene says: "Models were made in ZBrush, textures in MARI, visualisation in RenderMan. I also used tools developed by ULITKA (**www.ulitkapost.ru**). For the final assembly I utilised NUKE, with colour correction completed in Lightroom."
We say: *You can really feel the physical force behind this image, as two huge beasts battle it out for dominance.*

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Image of the month

Eggpool
» **Emanuele Scelza**
3DA username Dr.Wem
Emanuele says: "This image was modelled with 3ds Max 2013 and rendered with V-Ray. The egg liquid was created with RealFlow 2012."
We say: *Imagination, creativity and some technical simulation skill. This is an excellent combination of abilities that makes for one exciting image.*

Le Bal Masque
» **Amir Akbarshahi**
3DA username a_vray
Amir says: "This work was created in 3ds Max 2014 and I used V-Ray for rendering. Compositing was done in After Effects. For the hair I used Hair & Fur in 3ds Max."
We say: *This is a beautifully elegant image, with some great details. The hair of the character and even the lamp behind her have been carefully considered for the best result.*

Klosterkirche
» **Steffen Wiesener**
3DA username Biko
Steffen says: "This image is part of the reconstruction of the Stiftskirche Bad Hersfeld, which was destroyed in 1761. There is a lot more to see – such as the church's various buildings and its convent. I completed this work in 3ds Max using mental ray."
We say: *This image is full of atmosphere, thanks to the grainy filter and the bright outdoor light spilling through the windows.*

Cheeky
» **Chévon Leo**
3DA username Pancake
Chévon says: "This little guy started out as a sphere in ZBrush and was rendered in Maya with V-Ray. I challenged myself to see how much character I could get out of a sphere in an evening."
We say: *Well, Chévon, you got a lot out of it! This is a great sculpt that demonstrates a deep understanding of characterised facial expressions.*

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Get in touch...

3dartist@imagine-publishing.co.uk

Have your say

Email, Tweet or get in touch with us on Facebook to share your thoughts, opinions and proudest projects

Top tweets

Get involved... @3DArtist

@blenderhead1 Great to see a @3DArtist issue devoted to Blender, with some of my fav tutorial authors, an article from @BenSimonds and a link to @cgcookie tutorials.

@BrassEngineMatt Reading @3DArtist in the sunny garden and listening for the happy 'render complete' noise. Bliss.

@HeyJoe94 @3DArtist CGStudentAward entries are amazing! Entering next year.

You tell us

Image of the day by 3D Artist CG Student Awards 2013 runner-up Cindy Jang for her project 'Tortiglioni', created using Maya, Mudbox and Photoshop. It's making us hungry!

Facebook.com/3DArtistMagazine

Alex McClelland Anyone else lick the screen in the hope taste-vision had been miraculously invented?

Barry Marshall You would have to be real picky to find fault with this. I thought it was another food image posted by my friends at first!

Taz Selby NOW I'M HUNGRY.

Star letter

digital-tutors

www.digital-tutors.com is a learning resource site boasting a library of 20,000 video-based CG lessons

THE AUTHOR OF THIS ISSUE'S STAR LETTER WINS A MONTH'S FREE SUBSCRIPTION TO DIGITAL-TUTORS WORTH $45

The next generation

Hello 3D Artist! I'm a student currently working with an aim to get into games development – it's been a passion of mine for many years now. Having just watched the E3 conference and witnessed all of the amazing games coming out over the coming years I'm more excited than ever about the prospect! I read your next-gen feature in issue 55, but even though the power of the Xbox One and PS4 means more work for artists in the long run, I'm just not concerned. From modelling the smallest of rocks to the most towering of creatures, I'm more thrilled than ever about what the future of games brings. Anyway, I just wanted to get that off my chest. Keep up the good work!

Craig, via email

This year's E3 certainly had some exciting things to show, presenting just how powerful the next-gen consoles are going to be

We're excited too! Yes, the next generation of hardware means that artists will need to be as innovative as ever, creating entire worlds down to the very smallest detail. However, it's the passion of young artists like yourself that's going to make this happen. We can't wait to see what the next generation of artists will use the hardware of the future to create. One thing is for sure: it's going to be an exciting time to be a gamer over the coming years!

The 3D Artist CG Student Awards 2013 featured some great content this year. Be sure to check our Community wrap-up for reactions from the winners!

Judging the 3D Artist CG Student Awards 2013

I recently noticed that 3D Artist were the judges on the CG Student Awards. I'm thinking of entering next year and I wanted to know, what makes a good entry? Is it just the quality of the model, or is there more to it than that?

Geoff, via email

The quality of your work, whatever it may be, certainly goes a long way, but when judging we're not just looking for nice models and textures. We want to see examples of versatility as well as creativity. Building a standard alien is all well and good, but we want to see something new and exciting that hints at imagination.

The Sculptris search

Hey 3D Artist, do you know if there's any way I can access ZBrush completely for free? I can't find a trial but I really want to give the software a go!

Lucy, via email

*Unfortunately ZBrush currently does not support a trial version. You can, however, download its younger digital-sculpting sibling, Sculptris, entirely for free. Head to **www.pixologic.com** to download it today. Also, be sure to follow our Sculptris tutorial in issue 56 and show us what you make!*

Sculptris is ZBrush's younger brother, providing a bedrock of solid yet simple tools. In issue 56, Taron showed how to apply its painting features

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"HANDS DOWN MY MOST USED FEATURE WAS DYNAMESH. I ALSO USED QREMESHER, THE AWESOME POSING TOOLS, TRANSPOSE MASTER AND GOZ A LOT."
-DAN ULRICH
IMAGE CREATED IN
ZBRUSH 4R5®
Image Courtesy of Dan Ulrich
Pixologic.com
ZClassroom.com
ZBrushCentral.com
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> In feature film VFX I don't think you get anyone who isn't interested in what they do. At this level, people want to be the best effects artists they can be

Doug Larmour, global head of compositing, MPC

INSIDE MPC

3D Artist gains rare access to see how the feature film division of MPC creates some of cinema's most breathtaking visual effects

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Big things have small beginnings." *Prometheus'* David may have been referring to an artificially created form of biological warfare, but it's a sentiment VFX studio MPC has come to embody too, having grown from a small startup to one of the global leaders in the industry over a span of 25 years. From a simple idea, a rough sketch, or a few words scribbled on a page, the studio has created endless feats of vivid spectacle that enthrall millions, whether through award-winning commercials, television or feature films.

Following *World War Z, The Lone Ranger* and *Man of Steel*, demand continues for the studio's expertise, with its six worldwide offices currently working on no less than eight major motion pictures, including *Godzilla*, *Maleficent*, *Guardians of the Galaxy* and *300: Rise of an Empire*.

It should come as no surprise, then, that 3D Artist jumped at the opportunity to visit the studio's London facility, gaining rare insight into one of the most in-demand studios working in VFX today. Beginning with art direction and travelling through MPC's world-class production pipeline to final compositing, we reveal some of the departments through which a film travels; from small beginnings to very big outcomes.

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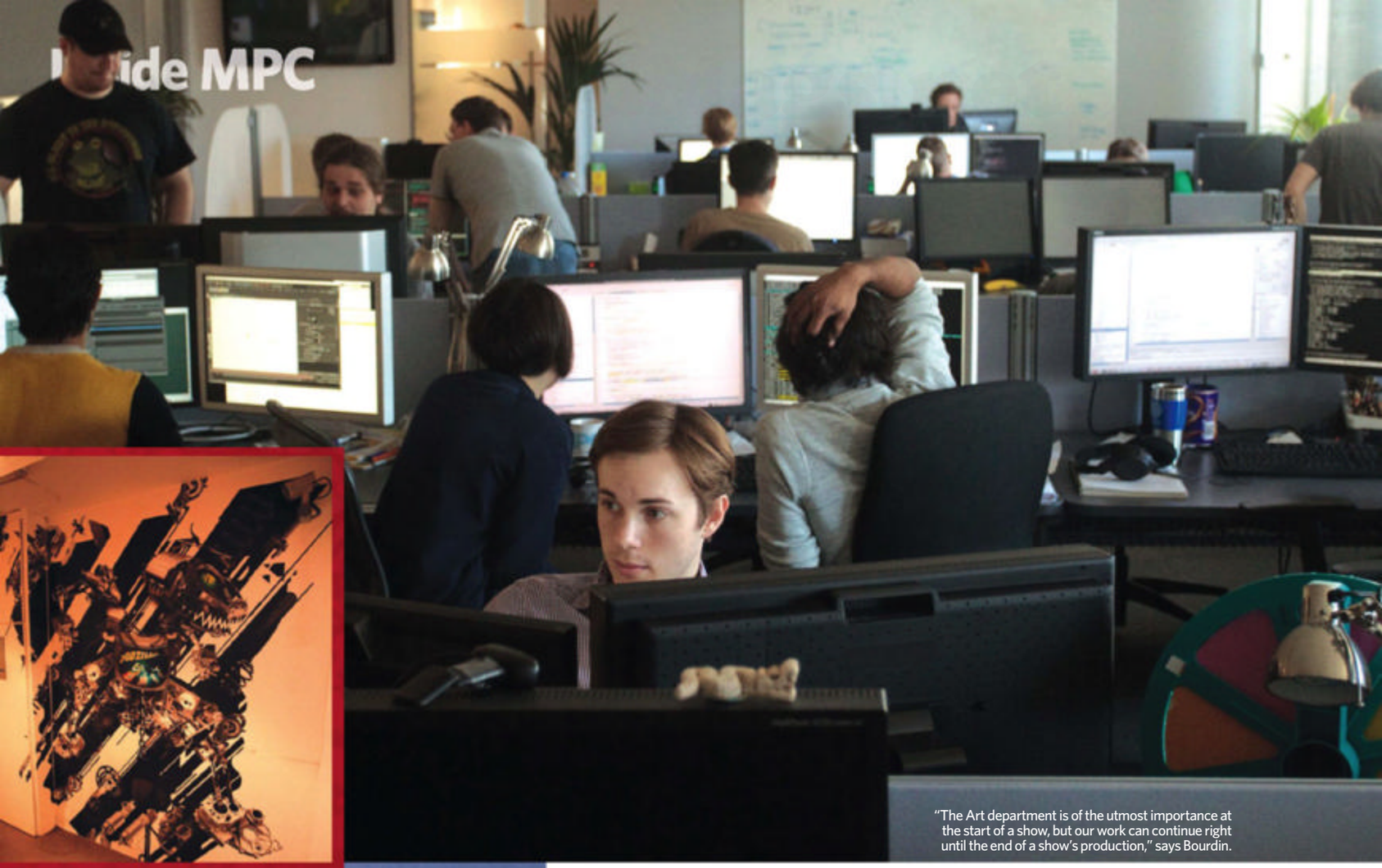
Inside MPC



"The Art department is of the utmost importance at the start of a show, but our work can continue right until the end of a show's production," says Bourdin.

MPC is currently working on big-budget movies such as *Godzilla*, *Guardians of the Galaxy* and *The Amazing Spider-Man 2*

MPC handled a lot of the fluid effects for Ang Lee's *Life of Pi*

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ART DIRECTION

The role of the MPC Art department starts as early as the pitching stage on a project, with the team preparing concepts and reference material for studios and directors. "The Art department is made up of a core of artists highly specialised in character, environment and FX design," says MPC art director Virgine Bourdin. "No single artist does one work – a final picture can be made with over six pairs of hands! We try to create our own internal pipeline; from storyboards through to character design and so on."

The Art department's spread of work goes from pitching through to production and includes full designs of unique creatures and tiny environmental details. "We tend to do big picture concepts for pitches and the more we stay working on the movie, the more we work on miniscule details," says Bourdin. "We may have to clear up the little details on the exterior of a spaceship, like the patterns and textures, so the Assets department has a clear guide on what needs to be done next."

The Art department's responsibilities change from show to show, with the work sometimes based on specific creature or object creation and at other times around mood and atmosphere. One requirement remains constant, however: "It has to look original," says Bourdin. "Those are the words spoken by every client. We need to see what the director's style is, his vision, and translate that into a drawing. Ridley Scott, for example, had a production designer on *Prometheus* who is the most precise I've seen on any movie – he had mood panels and colour boards, which is quite rare, so we had to fit our work into that style and mood.

"For other jobs we'll be able to plan out much more of the world ourselves. That's why the initial part of my job is to define the context of what we're working on, how much of a brief we're working with, and break down the task so that we know how to sell the vision of the director.

"It's a collaborative process," she continues. "We don't attach ourselves to the idea that a project is entirely our baby. We are part of team and work within the vision of the filmmaker." However, it's the nature of teamwork that makes the process so exciting for Bourdin. "For me the fun parts

> "We can't attach ourselves to the idea that a project is entirely our baby. We are in a team and work within the vision of the filmmaker"
>
> **Virgine Bourdon,** art director, MPC

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MPC provided VFX work on one of *Man of Steel*'s key action sequences, as Superman does battle in his hometown of Smallville
© 2013 Warner bros. Entertainment inc. and Legendary Pictures Funding, LLC

are the brainstorms we do and working with the artists on the floor. The brief is our quest and we're all on the road towards it together. It's that moment, when you're creating something new, and having fun, that can create the wow effect. When you team and the filmmakers are saying 'wow', you know you've made something awesome."

CREATING ASSETS

Once the Art department has produced a vision from the director's initial brief, the 3D part of the process kicks into gear – although, often, the two teams are found working in tandem. "We're one of the first departments to start on a show," says Elliot Newman, global head of assets at MPC. "Essentially, as soon as we're awarded work on a project, my team will be the first to get involved and figure things out. As such, we're usually seen as the first department to take on work on a project and then we're often involved in the final stages as well."

While the Art department works on the research phase, mood panels and mood boards – establishing the broad strokes of the film – Newman's team begins to take those things to develop them into fully fledged 3D assets for use throughout the pipeline. Some conceptual work can also be completed in 3D. "We might have a big creature to work on, so we'll fire up ZBrush or Maya to mock it up in a looser way. We'll then go through the design process iteration with the supervisors, directors, studio executives and so on," Newman says.

MPC's Assets team works on the full gamut of objects, whether that's a roaring dragon or a bookshelf. "We do the whole thing, from hero spaceships to the smallest of props. We even model low-resolution geometry for matte-painting work, or we'll build things for effects, such as simulation meshes, so FX can run water simulations that collide against objects."

Of course, the job has its exciting moments too, such as the creation of the Prometheus ship in the film of its namesake. "When we started, it was essentially a block model with additional lines drawn on top to suggest surface detail, as well as some paint studies to show what the logos would look like on the side," says Newman. "However, a lot of details such as what sort of metal it was made from and which carbon materials to use was decided by us. For the build we had to consider the metals, plastics, dirt, dust, damage and so on." The team even considered the interior of the model, for when it is later blown apart. "We knew which parts needed to be destroyed and from what angle, so we knew that it couldn't just be a hollow surface and that there had to be a form to it – some structure underneath. You always tailor the build to the context of the shot. In this case it was a slow-mo destruction shot, which is one of the hardest because you've got nowhere to hide," Newman continues.

It's the challenge of the work that makes it so rewarding, though. "As challenging as the job can be, it's a great culture to work in," Newman explains. "It's a balance of creative and technical thinking with cutting-edge technology. We're forever using new gadgets, tools and techniques. Every day, every project is different."

BUILDING RIGS

Rigging the models sent over from the Assets department is the next stage in the pipeline – a task that's become increasingly complex with the rising expectations of audiences and filmmakers alike.

Analysing the pipeline

The global head of pipeline, Hannes Ricklefs, describes the complexities his role and what it's like to work at MPC

What is your job and what do you do on a day-to-day basis?
Our software department is split into three main areas. There's the pipeline team which I look after, the CG tools team which builds our proprietary software such as Kali, Alice, Papi and Furtiliy, and the third component is our show and department development and support. The pipeline and CG tools focus more on longer-term development, ensuring that we are stable and robust. The show/discipline development and support deals with the here and now. Our artists, shows and disciplines have daily needs both in terms of support when certain aspects don't work and when a new requirement comes up that necessitates custom development.

Does MPC have a standard pipeline that it uses for every project or does it change from project to project?
The word pipeline is such a vastly overused word within the VFX industry, it could be argued that it basically means everything. To us there are multiple components of a pipeline: starting from the infrastructure, to core APIs and applications, and finally custom scripts by the artists. We try to standardise as many of these components throughout our pipeline - for example we describe the structure, content and dependencies of shots, characters and environments through our asset management systems. This gives us a standard structure for people to work with. However things need to be customised per show, which is a challenge when you work on a global scale.

Can you run through the pipeline for Man of Steel and the different challenges that were encountered?
One of the particular challenges we had was to combine multiple live action footage with multiple full CG takeovers within a single shot. We would receive multiple plates that were all going to be in one shot, and we then had to intercut CG within them. We delivered a pipeline tool that enabled us to visualise these individual plates as one shot. It could be compared with artists doing editorial work within a single shot where each camera represented parts of the "shot edit". Normally we have a single camera for rendering a shot. This is where the complexity can come in, when you're used to traditional methods, but then you are asked to do enhance these defined processes with new requirements.

Could you talk a little about the culture and philosophy of MPC?
It's one of those places where you feel that people have made their hobby their job. With that just comes sheer passion. It's no lie that feature film VFX can be high-pressure work when you're up against a deadline, but we're trying very hard to avoid that through making our pipeline as efficient as possible. MPC is a place where we never stop improving, once a new piece of software is out people immediately think about the next stages. To me, seeing the visual result on the big screen is just the best thing.

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"Our involvement on a show can vary, but for a creature show we'll normally be included reasonably early on," says MPC global head of rigging Tom Reed, who has over a decade of experience at the company. "We can bring along ideas about anatomy or structure for a creature and start talking about how the limbs might move. We suggest ideas based on nature but from a technical perspective. We also work with modelling if face shapes are needed, or making sure topology is correct, or even mundane things like naming objects to ensure they're pipeline-ready."

It's the creature shows that usually prove the most complex for the Rigging team. "Our muscle rigs are always very tricky, particularly with dragons and such," explains Reed. "However, we've been doing muscle rigs for a number of years and we've got a good toolset that enables us to take things from previous features and add to them. Because we script everything, we're able to build on the shoulders of our past work."

One exciting early career moment that stands out for Reed is Voldemort's nose – or lack thereof – in *Harry Potter and the Goblet of Fire*. "That was a difficult one. How do you replace Ralph Fiennes' nose?" asks Reed. "We worked with the Roto-prep department so they could work in key frames and then we'd project that back to clear out the back plate. We also worked with R&D on feature tracking, so we could track markers from the camera and project them back onto an object space. Then there was a rig that would follow those, which had basic distance measures between different trap points, which would then drive blend shapes. This was at the time we were starting to build the pipeline as well, so it was very exciting developing an efficient method. Things have moved on a great deal from those days, but it stands out as a project where I learned a great deal."

The Rigging department works very closely with Animation, with a lot of back-and-forth between the artists. "Some of the more technical animators might rig something up with locators and constraints, then we'll take that back, pipeline it, work on it and maybe develop some nodes to make everything work faster – that kind of thing. It's all very collaborative," Reed explains.

Although the rigging process is largely technical, there's also a big focus on both the artistic and scientific facets of the role. "There's a huge amount of research that goes into anatomy studies or locomotion," says Reed. "For example, we got a paper from Cambridge University, which was produced decades ago, about rectilinear locomotion and how snakes stalk their prey. Also a palaeontologist from San Diego has given talks about the differences between carnivores and herbivores and why they walk the way they do. These are topics interesting not just for riggers, but for the whole gamut of artists involved in trying to make something real. Once those rules of nature are broken, it's very easy to lose believability, no matter how good your subsurface scattering or muscle dynamics!"

ANIMATING PERFORMANCE

Like the Art, Assets and Rigging departments, Animation's involvement can start early in the pipeline at the pre-production stage. "You need to start establishing character movement and style at an early stage – sometimes before they've started shooting," explains Greg Fisher, global head of animation. "Pipeline-wise we obviously get assets made in the beginning and then there's a lot of conversation between Rigging and Animation to develop the rig as we go along. Once the animation has progressed and we're moving towards the end of the show, we start working on what is called technical animation, which is work such as muscle deformation and cloth."

In terms of complexity within animation, Fisher cites *Wrath of the Titans* as one of the most challenging projects to date, featuring such creatures as the two-torsoed Makhai. "The challenge there is how you make something like that feel real anatomically and then translate that design into animation," says Fisher. "There was a lot of back-and-forth about where to put the two spines, how they would merge together, how you would place the extra set of arms... It was quite a complicated process. What looks good as a still image might not necessarily work as a moving character."

Despite the popularity of motion capture, the majority of MPC's work remains key framed. "*Wrath of the Titans* was fully key framed," says Fisher. "As an animator myself, it's not that we don't like motion capture – it's a good tool – but animators like to key frame and give their creative input on their work. More often than not if you're shooting motion capture, it's before you've shot the movie. You may have good intentions for what you want to do for that specific shot, but when you put it in the movie three months later the director may not be happy with it, so you end up key framing it anyway."

For Fisher, it's the people, rather than the tools, that make MPC the master of animation that it is. "Animation is a creative medium, so it's about that skill of the animator, rather than the technology they're using," he says. "What excites me is key framing, and bringing something to life by hand. That comes from your passion, your heart and your love for the art that you do."

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Reducing render time is a challenge, but as Leda says, "When it comes to the final render we don't mind if it takes a long time, as long as it looks cool!"

There's a lot of collaboration between the teams in FX. "You can learn new tips from someone working on different shows and shots," Panis tells us

Although audiences constantly demand bigger and better visuals, Reed says the department also demands that of itself. "We're part of that process. We want to do better and do more"

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WORLD-CLASS FX

"At MPC, FX is whatever volumetrics is," explains head of FX, Joan Panis. "That could be smoke, fire, water or particles such as dust. The landing of the Prometheus ship on LV-223 was a really nice shot using lots of these different volumetrics. We also created all the water works in the storm sequences in *Life of Pi,* and we created destruction effects, using our custom proprietary tools, in the Smallville battle in *Man of Steel*."

MPC's bespoke destruction tool is Kali, an impressive toolset developed for the hyper-kinetic VFX sequences in Zach Synder's fantasy film *Sucker Punch*. It has been a mainstay in the studio's pipeline ever since. "Kali is based on the DMM solver – a Maya plug-in – that we've incorporated in our own way," states Panis. "Kali enables us to make bending, tearing and deforming objects that we couldn't achieve with the traditional rigid-body systems.

"If you have a plank of wood, for example, then there are some very technical terms, such as Young's Modulus, which inform how much the material will bend or strain before fracturing," continues Panis. "We have all these attributes that we can change in the material. Wood doesn't tend to stay bent once it's bent, it will return relatively to its original form, whereas metal, once it is bent, remains bent and deformed. We can play with all of these attributes within Kali."

Kali's ability is particularly evident in *X-Men: First Class*, when Magneto tears a ship apart using two huge anchors. The tearing, snapping, bending and breaking of the yacht is an impressive feat indeed.

Flowline, Scanline's hydro-fluid-simulation and fire-rendering software, is another popular choice in the MPC FX department. "We're one of the only ones using this tool," enthuses Panis. "It's powerful in the sense that it enables us to create awesome volumetric effects. On *Wrath of the Titans*, for example, when Kronos comes out of the volcano you get these big, fiery plumes that are kilometres long. Flowline can handle these volumes well and still display all of the details. It enables us to get that detail very quickly. We also did the water on *Life of Pi* recently over at Vancouver and there's the whole sinking of the Tsimtsum sequence. All of that was done with Flowline and the end result is really quite impressive."

> "You quickly realise that the information you have is only going to get you to a certain point. That's where the more creative side comes in"
>
> **Patrick Leda, global head of lighting, MPC**

LIGHTING THE SCENE

"You could divide my job into three different areas," says Patrick Leda, global head of lighting at MPC. "There's a technological aspect, where I am responsible for pushing technological advancements in lighting and pipeline. Then we have the managerial aspect of organising the team of artists, mainly in London but also in our other global facilities. The third aspect is more creative, where I can get involved directly on a show, in which case I will be supervising lighting or look development. It can be quite varied on a day-to-day basis."

In terms of pipeline, Lighting works very closely with Look Development, coming into the process almost parallel with Texturing, right after work on the assets has begun. "Texturing will start building the first pass of textures, then they'll pass them to Look Development and we test them in our standard light rigs for day, night, interior and exterior shots," says Leda. "We can quickly see how the assets work in different lighting environments. That's when the back-and-forth between Texturing and Look Development happens and you can think about how the asset in question is going to look in a shot. You move to a more shot-centric way of thinking, so when you set up your shaders to do something, you have to think about the context. Is the asset going to be big on the screen? Are there a million of these characters or just one? Based on this you make decisions on whether or not you're going to ray-trace or how you're going to do subsurface scattering and so on. Once an asset is approved in Look Development, that's when we pass it on to lighters."

Typically lighting is one of the most demanding aspects of production, and as

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Larmour cites NUKE as a handy tool for a compositor, matching the increase in VFX complexity with its innovative design. "Field-of-view issues, infinite workspace issues; they're all gone," he says

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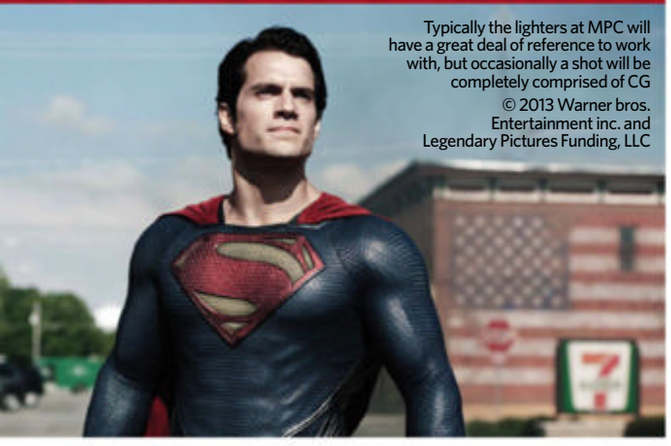
MPC

MPC has offices located all over the world, including major cities such as LA, Vancouver, Banagalore and London



Typically the lighters at MPC will have a great deal of reference to work with, but occasionally a shot will be completely comprised of CG

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> "Reality is a multitude of imperfections...If we can add these details to our work, we can sell that perception of reality"
>
> **Doug Larmour,** global head of compositing, MPC

such MPC has a distinct approach to its shows. "We have a structure where the lighting leads have their own group of TDs under them," says Leda. "The lighting leads give them the first notes, then during dailies they come in and the CG supervisor, the lighting supervisor, or possibly the VFX supervisor will look at the work and have a discussion about it. It's a collaborative process with the goal of improving the image in question."

One particular sequence that Leda remembers is the horrific transformation of Hank McCoy into the ferocious Beast in *X-Men: First Class*. Here the team faced the challenge of matching the on-set lighting. "There are standard techniques that most people use, like taking HDRIs of the environment, or using spheres for reference," he says. "We often do a laser scan of the scene on the set and that also gives us additional information about the actual physical position of lights. However, you quickly realise that the information that you've gathered is only going to get you to a certain point. That's where the more creative side comes in, understanding what the physics tell you, seeing what the render is giving you and working out why it's not quite looking right. You have to interpret the scene: is the shadow sharp enough? Is the angle right? From information like this you understand what you have to do.

"Usually the foundation is as technical and as physically accurate as it can be to begin with, then the last 10-15 per cent of the process is the more creative aspect," Leda adds. "Those are the two core ingredients that make a good lighter – understanding the technical aspects of lighting while also having a good eye for the creative side."

THE FINAL STEP

Doug Larmour, global head of compositing, details why it's the details that ultimately matter most. "Compositing is an incredibly important part of the VFX process, particularly for MPC as we strive to create photoreal images," he tells us. "In terms of how compositing works at MPC, it's the final link in the chain. It's the discipline that pushes a shot from being CG to looking 100 per cent naturalistic and photographic.

"It's important to recognise that reality is not perfect," he says of the compositing craft. "Reality is a multitude of imperfections that the human brain instantly recognises... For instance, if you look at *Life of Pi*, how much water is on that lens? How much do the lights smudge and arc? All of that additional work is what made it look so good and helped *Life of Pi* win an Academy Award for visual effects."

An example of how these imperfections transform an image to perfection is when the eponymous Prometheus makes its landing on the alien planet of Ridley Scott's sci-fi epic. "First the plate came in and we graded that to make sure there was a balance grade between all of the shots in that sequence," Larmour explains. "We then put a lead artist on what we thought were the key shots to drive the look for every other shot in the sequence. The Compositing team worked with the Environment team to build up the sequence exactly as the filmmaker requested. We graded the foregrounds at that point and waited until CG had a first version of an animation of the ship landing. We then did some work on the thrusters, as it was decided that, rather than the FX team working on them, the comp team could take over. The thrusters were a fire element that was wrapped around a cylinder and animated up and down. The environment and 2D lead on the sequence worked on trying to get the right amount of mountains in place, then the right amount of smoke and mist on those mountains. You only see about 30 per cent of the effects rendered for that shot. Everything else is from our vast library of 2D elements of smoke."

If there's one point that everyone at MPC agrees on, it's that every day presents a unique challenge for the studio to undertake. Whether it's transforming a crude scribble into a mythical creature, assembling a horde of undead killers or making the imperfect perfect, MPC is pushing to provide the very pinnacle of VFX excellence. "Everyone wants to have something on their reel that looks awesome," concludes Larmour. "In feature film VFX I don't think you get anyone who isn't interested in what they do. At this level, people want to be the best effects artists they can possibly be."

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DIGITAL DEAD: CREATING WORLD WAR Z

Words: Joe Nazzaro

From digital doubles to entirely CG environments, Paramount's big-budget blockbuster is one of the most ambitious zombie flicks yet...

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> "The cool idea that got everybody massively excited was that there would be a sea of zombies, more than you'd ever seen before"
>
> **Kevin Jenkins,** art director, Framestore

Let's face it, zombies and digital technology have always had an uneasy relationship on the big and small screens. While the videogame industry was quick to embrace the possibilities of the digital dead (witness *Resident Evil*, *Doom* and their countless descendants), film and television were much slower to jump on board. While the 1990 remake of *Night of the Living Dead* was arguably the first feature to use digital design techniques to create zombies, it really wasn't until such projects as *Dawn of the Dead* (2004), *I Am Legend* (2007) and AMC's *The Walking Dead* TV series that the entertainment industry was happy to embrace large-scale fusion of zombies and CG technology.

Now there's *World War Z (WWZ)*. Based on the novel by Max Brooks and directed by Marc Forster (*Quantum of Solace*), the big-budget feature film adaptation stars Brad Pitt as Gerry Lane, a UN investigator travelling across the globe in a race against time to stop a zombie pandemic. Unlike most zombie-related projects, which generally make up a crowd of extras in all kinds of gory prosthetics, the tens (if not hundreds) of thousands of zombies required for *WWZ* necessitated a huge digital presence. With design work contributed by Legacy Effects and Framestore, the film's stunning visual effects were largely split between vendors Cinesite and MPC.

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Digital dead: Creating World War Z

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> "We did many tests at various levels of what somebody would look like and progressions of what happens to you once you start to become a zombie. It was difficult, because it's territory that's been covered countless times"
>
> **John Rosengrant, character design supervisor, Legacy Effects**

Designing the dead

Long before the first scenes of *World War Z* were shot, two groups of designers were working out just what that world would look like. While producer Colin Wilson enlisted the service of Legacy Effects, with whom he had worked on such films as *Avatar*, *Terminator 3* and *Jurassic Park*, Forster turned to the team at Framestore for its own take on the project. "We got started on our design pass, wanting to take the approach that they should be very real, forensic zombies, based on what had happened to them," recalls Legacy character design supervisor John Rosengrant. "This would depend on if somebody had been dead for a long time or if they had just been turned.

"We did many tests at various levels of what somebody would look like and progressions of what happens to you once you start to become a zombie. It was difficult, because it's territory that's been covered countless times.

"My presentation was to look at forensic pathology books and study what people look like when they die. There's something in nature that is a little more horrifying than eaten-away skin, such as bloating and discolouration, which can be very frightening," Rosengrant explains.

While Legacy was working on its set of designs, director Marc Forster was working with Framestore, where art director Kevin Jenkins had recently formed the Framestore Visual Development unit, an in-house art department that could also work externally. "I think the way to describe our involvement is that Marc and the production team hired us as a think tank, coming up with ideas and concepts to keep driving things forward," claims Jenkins. "We did 18 months of drawing and design work, generating hundreds of pieces of artwork.

"We were informed about the PG-13 rating very early on, which had massive design implications," Jenkins continues. "I knew Legacy was doing very gory zombies at the beginning, which were kind of cool, but we couldn't make that film. That's when Karl Mooney (one of my colleagues I started the art department with) and I came up with the idea of the flock or flow of the zombies. In fact, if you see the poster of zombies pulling down a helicopter, it's an exact copy of a piece of concept art we came up with. Our take on zombies was where we said: 'We can't do one zombie, but we can do something really cool with thousands of them!'

"The cool idea that got everybody massively excited was that there would be a sea of zombies, more than you'd ever seen before. They don't care about one another, they're just like junkies with a hunger for what they need, so they are literally tumbling over one another. We used reference of rats spilling out of ship, flocking birds and animals that literally used one

Building a better zombie

The zombies of *WWZ* were always intended to be a combination of makeup and visual effects techniques. "We created a Stage One to Four system," explains Kevin Jenkins, art director at Framestore. "Stage Four would be a fully CG creature. In this way, being a PG-13 certificate, you could blow his head off or whatever you wanted to do without anybody worrying that it was a real person.

"Stage One was a person who had just been infected, in Two he was starting to deteriorate and by Three it was definitely on its way. We would do makeup ideas directly on photographs so people could see what they would look like. I would show them to Fran Hannon and Mark Coulier who were doing the makeup, so there was no way we were designing anything they couldn't do.

"Because the zombies needed to look withdrawn and reductive, we would literally take a sculpt of a human being, then start to remove fat and tighten it up, trying to make it look cool, because we didn't want them to be lumbering idiots. We also wanted to have some aggression in their faces, which is why we deliberately designed the muscles around the face in our sculpts, then printed out a full-sized bust from one of our ZBrush models.

"On a movie like this, the actor had to look like a zombie, but he also had to look pretty cool, as well as aggressive and almost like a superhero in a way. There are always compromises to be made to the design, even though it's a reductive model, so you did want to feel sorry for them. You wanted to be scared, not in a horrifying gums-are-bleeding kind of way, but more in a: 'Wow, he looks cool, you wouldn't want to mess with him in a dark street!' way."

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another as the next step of the ladder. That's why they roll and flow: they're constantly scrambling over one another in order to move forward."

Beginning of the end

While there was some overlap in terms of *World War Z*'s effects load, the film was largely divided between major FX houses Cinesite and MPC. "The movie initially split down the middle with Cinesite doing the first half and MPC doing the second," explains Cinesite's visual effects supervisor Matt Johnson. "That shifted and changed a little bit as things went along, but that was the original plan."

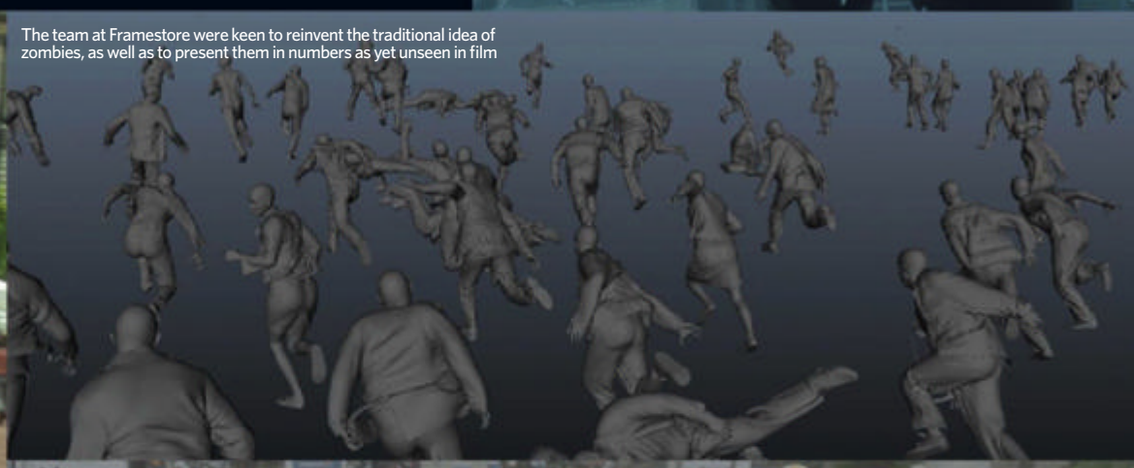
Stylistically, Forster wanted *World War Z* to reference 70s movies such as *The Parallax View* (1974) and *All the President's Men* (1976). "Even though there were CG zombies and environments, it had to feel like an old-school movie where the camera would just pan over something and we would see it rather than 'here's a beautiful visual effects shot, where the CG character will leap on frame #37 and be perfectly within frame!'," explains Johnson. "It needed to look like a cameraman responding to events, rather than those events unfolding under a carefully choreographed camera."

As an example, Johnson points to a scene at the film's beginning, where Pitt's character and his family are introduced. "It's just a conversation where they're sitting in a car in Philadelphia, but the only filming in Philadelphia was by myself and my visual effects still photographer Aviv Yaron. The rest of it took place in Glasgow, Scotland, so the challenge was turning Glasgow into Philadelphia. For realism's sake, I was very keen to make the digital work feel photographed rather than rendered. To that end, Aviv and I spent a couple of weeks in Philly, just photographing vast façades of buildings, going up in cherry pickers and onto roofs to amass a vast library of real images. We integrated this with stuff set up in NUKE to create a fusion of 2D, 3D and CG-projected environments that fit within the handheld documentary style the movie was shot in.

"Because Glasgow has buildings that are three stories high rather than 30, when we were shooting it, the DOP would scrim off the entire street so the roads would always be in shadow. That really helped us, because we were able to create the sense that we're looking down a canyon, when in fact what you're looking at is a little foreground bit of the lower streets of Glasgow. However, the cars , boulevards and people are all CG, so there's a lot of what I hope will be invisible effects among the more obvious and gratuitous zombies and massive crowds.

"Most of the set extension work was done by our 2.5D Environments department, which was headed up by

Greenscreen was widely utilised in order to re-create urban locations the filmmakers would otherwise have no access to



The team at Framestore were keen to reinvent the traditional idea of zombies, as well as to present them in numbers as yet unseen in film

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Digital dead: Creating World War Z

NUKE was used in the re-creation of digital locations, including panoramas of New Jersey and Philadelphia

Thomas Dyg and they did an amazing job," adds CG supervisor Anthony Zwartouw. "We initially thought we might have to do some extra CG lighting on top of it, but Matt and Aviv took some amazing reference photography that was projected onto a fairly simple geometry and it really worked."

A big portion of the Cinesite team's work also went into creating the look and movement of the digital zombies. "There is a progression in the film, so once we get to Israel, there's a certain behavioural characteristic and development that the audience will see. All of this was planned out, drawn, animated and tested to get that progression," says Johnson.

"What we did was bring in a lot of experimental dancers, people who did avant garde ballet and choreography, who could do the most extraordinary things with their limbs and the way they contorted their bodies," Johnson continues. "That opened things up in terms of zombie movement.

"One of the things we worked quite hard on was the zombies' raison d'être, which was to bite and kill, then move to the next victim. There's something inherently human about the fact that, for example, if you and I were trying to take somebody down, we would lead with our arms, but that essential humanity is lacking with a zombie, because they don't care if they smash each other up. They'd lead with the mouth and teeth, because they want to bite somebody.

"We found that this wasn't something we could physically do, even with the best dancers or stunt people, so that was when we had to move into CG. You can't do it for real, so we referenced footage of Israeli attack dogs that basically leap in fangs-first and pull the victim down, which we translated into our zombies. It was all about getting the physics right."

"Obviously, our biggest stuff was the zombies and people, where we had six full-on hero digi-doubles who sometimes had to intercut with live-action characters on-set," adds Zwartouw. "For this we had full hair and cloth simulation, facial expression capture, all of that stuff. Then we had a full-on crowd build with over 50 characters. We got the base setup of these from MPC, who built some clothes for us, but because our characters were different from theirs, we basically had to rebuild all of the heads and regroom them for the hair, so that entailed a lot of work.

"Because certain characters were selected to become digi-doubles after the shoot was done, we may have had photo reference but not a scan. To solve this we came up with an interesting idea for rebuilding faces, where we used Cinesite staff who looked as similar as possible to the cast members for an expression shoot. We extracted those expressions, applied them to our digi-doubles and got a really nice result out of it," Zwartouw explains.

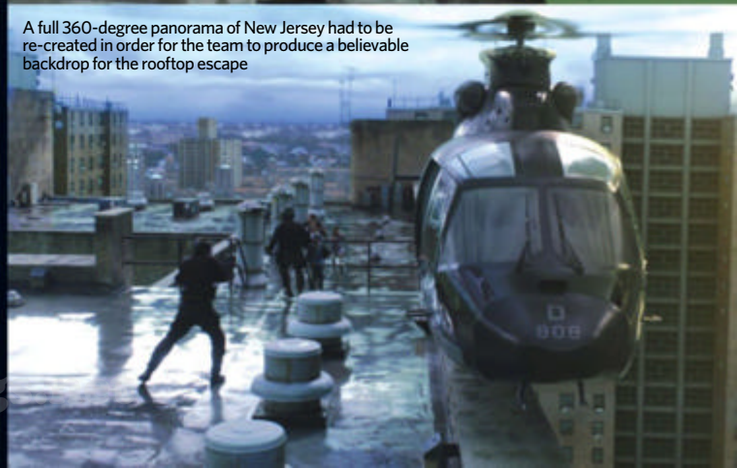
Pyramids of the dead

With Cinesite focusing its efforts on the first half of the film, MPC was hard at work on the second. "We worked on a bunch of different sequences, including a sequence in Israel, where we produced a lot of crowd simulation, environments, planes, a helicopter crash, zombie augmentation on live-action close-up stuff, pre-plane crashing stuff and looking out through the plane," explains MPC visual effects supervisor Jessica Norman. "There was quite a wide range of different types of effects, but with an obvious focus on the zombies."

Because most of MPC's work was based around the latter sections of the film, where the zombie plague is well on its way to becoming a pandemic, there was a great deal of discussion about how the massive herds of zombies would move around. "They don't feels any pain, so as long as they get to their target, they don't care about climbing on top of one another or whatever," explains Norman.

"As we started talking about that movement on a larger scale, we discussed what would happen when you get a really

> "We referenced footage of Israeli attack dogs that basically leap in fangs-first, which we translated into our zombies. It was all about getting the physics right"
>
> **Matt Johnson,** VFX supervisor, Cinesite



A full 360-degree panorama of New Jersey had to be re-created in order for the team to produce a believable backdrop for the rooftop escape

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Though the marauding zombies clearly steal the show, WWZ is full of visual effects shots that you might not realise are CG at all

Escape from New Jersey

Many of the most painstaking visual effects shots in *World War Z* are all but invisible. Johnson is particularly happy with one memorable sequence in which Brad Pitt's character and his family are airlifted to safety from the roof of a New Jersey apartment building. "The thing about that location is there aren't any tower block-like housing projects in New Jersey, so what we had was a small roof set surrounded by greenscreen, so it was basically a green box. We literally had to create a 360-degree photoreal environment that could work from any angle with handheld cameras.

"We really needed to make that space look realistic, so I spent a week in New York – the buildings are based on a project in Harlem – where Aviv and I went up and photographed the roof. We also drove up and down the neighbourhood doing tile textures of different buildings, so the mid-ground and distant background buildings are all elements from the Lower East Side. Also I found a tall building in New Jersey where we managed to talk ourselves onto the roof. We then captured sweeping panoramas of what would be in the view so that you could see downtown in the background.

"We then took those stills and created that environment using the basic 3D geometry capabilities of NUKE, rather than Maya or Renderman, with real-world elements projected onto it. I wanted everything to feel realistic with all those layers of dirt showing that this building had been there for years and we just happened to photograph it. We then spent a lot of time making sure the depth of field was correct, with the right chromatic aberration on the lenses. In the end, all of these quite miniscule aspects combined to make everything feel as realistically photographed as possible."

dense crowd in a small space, making that movement almost like water, where the guys with more energy end up making it to the front only to be taken down by the guys behind them. Zombie pyramids were also discussed early on, as well as the fact that the zombies start climbing on top of one another in their desperation to get over the wall. We were supplied with some excellent artwork that helped create the kind of images we were looking for, in terms of the shape of these pyramids," Norman explains.

MPC used a variety of techniques to build the pyramids of zombies. "For example, we shot guys crawling on nets and stuff at different angles," says Norman. "We started off by defining the general shape and built it up from there. One of the challenges was presenting the density of the crowd and how close the zombies are together, so we would populate the majority of the pyramid and animate work on top of that, then create various vignettes of zombies crawling on top of one another or falling."

The decision to scrap *World War Z*'s third act and replace it with a new ending meant a lot of last-minute work for the MPC team. "There's a sequence on a plane that takes off from Israel and some zombies manage to get on, so it's all about the craziness that follows," recalls Norman. "That includes some enhancements of makeup and greenscreened windows where we can see Jerusalem in pretty bad shape. A grenade blows a big hole in the plane, dragging the zombies out and we end up with the plane crashing towards camera.

"There was a sequence that followed, as they go the World Health Organization and end up meeting more zombies, so we ended up doing some environment work. We also completed some enhancement work on the zombies and there were a few re-times where we changed the performance of our live-action guys by retiming certain limbs or the blinks of eyes.

"We also worked on an epilogue, which includes some zombie pyramids and we worked on a scene set in India with a lot of zombies and another with a big piazza in Venice, again with a whole load of zombies. We definitely got to the stage where we needed more hours for sure, but it worked out pretty well in the end."

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> "There are hundreds of people at Cinesite and MPC who have spent two years of blood, sweat and tears trying to get this movie to the screen"
>
> **Matt Johnson,** visual effects supervisor, Cinesite

Though the project was a massive challenge in more than one way, the VFX teams are immensely proud of the results they were able to achieve

World War Z's revised ending has caused controversy, but the creative teams hope people will judge the film on its own merits

Final cut

Much of *World War Z*'s revised ending has remained under wraps, but as Zwartouw notes, Cinesite was asked to create one of the film's final shots. "It's a very cool establishing shot, where we're flying over a military camp that has now been built up. There's a helicopter flying over a coastal area and we had to build the entire military camp, creating Quonset huts, putting all types of military vehicles in there and populating it with soldiers and that kind of stuff as well. It's a long sweeping shot, so that was a nice way to end our work on the film.

"Originally there was nothing there, it was literally just a coastal countryside," continues Zwartouw. "All of the military stuff that was added was completely us, from barbed wire to military personnel. But because it was just one shot, I decided to treat it almost like a small show. I put together a small team of really talented people (although obviously everybody at Cinesite is very talented) so there was a lot of communication, as well as figuring out what we really needed and what we didn't need. It was a real mix of 3D, but also a lot of clever matte painting to fill in the gaps where we needed to put all the detail in for realism.

"Because it was a standalone shot done by a small group where everyone was in contact all the time, it went around and around. For instance, we had our lighting and we'd bring it into our compositing, because we rendered out a lighting pass. We gave it to matte painters, then it would go to compositing, but we might need to tweak something in lighting that we didn't fix in the matte painting. We would then make tweaks and it would go back through again, so we kind of had a feedback loop where we were able to get to a very polished result very quickly."

Post-apocalypse

Production on *World War Z* may have taken some unanticipated twists and turns near the end of production, but the film's visual effects team is proud of what they were able to accomplish on the zombie epic. "I'm really pleased with our hero digi-doubles," reflects Zwartouw. "Digital humans are one of the hardest things you can do, so we had to develop things like our human cloth department, where everything had to be set up and executed properly.

"There's a screenshot of a zombie woman attacking a guy on the floor and I'm not even sure if people will notice it's real or not, but it was very successful and one of the shots I'm most proud of. However, the real paradox of it is, if we really nailed it, nobody will notice!"

"I think we learned a lot," agrees Norman. "One of the things I really enjoyed was the process of working between our departments. Our crowd tool Alice was one of the things that brought everything together and we learned some things to make it easier between crowd and animation, right through to lighting, cloth setups and how they work with our environments. I think some of those tools will be valuable in terms of improving the work we do in the future."

"I'm very pleased with the environment work we did," adds Johnson. "There are a lot of shots where even the filmmakers involved in the re-shoots were asking what locations they were shot in, only to be told they were completely CG, so that was gratifying to hear.

"I'm also pleased with the level of our CG creature work, because a lot of the work that Cinesite did was in the first half of the movie, where the zombies looked their most human. There are shots where we cut from a live-action actress to a CG creature, but hopefully we were able to seamlessly intercut between the real person and their digi-double, both equally in full frame.

"There's a lot of stuff that's been written about the movie and, to be perfectly honest, not all of it is true at all," Johnson concludes. "I think there have been a lot of people jumping on the bandwagon, but hopefully people will judge *World War Z* as a film that stands on its own merits. If they don't like the movie or they don't like what we've done with the zombies, I hope they will at least take an interest in the amount of work that's gone into it from the VFX point of view. There are hundreds of people at Cinesite and MPC who have spent two years of blood, sweat and tears trying to get this movie to the screen!"

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HIGH CONCEPT:

GAVRIIL AFANASYEV KLIMOV

We speak to Kojima Productions' senior concept artist about the craft of imagining new worlds, from sci-fi battle mechs through to far-flung alien galaxies…

> "ONE DAY I CAME ACROSS THE ATTACK OF THE CLONES ART BOOK, AND I WAS STUNNED BY THE AMAZING PAINTINGS BY RYAN CHURCH AND ERIK TIEMENS. I DID SOME RESEARCH AND LEARNED YOU COULD ACTUALLY MAKE A CAREER DOING ART FOR MOVIES"

Like many children, the young Gavriil A. Klimov (www.hexeract.org) was often to be found scribbling on scraps of paper. However, upon attending high school, he found he lacked the time or the encouragement to pursue his artistic aspirations. The closest he got was web design; a discipline he wasn't particularly keen on.

Like many in the CG industry, it was *Star Wars* that changed everything. "One day I came across the *Attack of the Clones* art book, and I was stunned by the amazing paintings by Ryan Church and Erik Tiemens," remembers Klimov. "I did some research and learned you could actually make a career doing art for movies."

Klimov scoped out other art books, keen to learn as much as he could about the world of concept art. "I was blown away by the beauty and the imagination of those artists, and the idea that you could do that for a movie was just too exciting for me," he tells us. "I noticed most of the top talent from the field went to the Art Center College of Design in Pasadena, so naturally that's where I decided to go. I prepared a portfolio over a whole summer, got a scholarship and got accepted." It was here that Klimov's enthusiasm for concept art turned into something that could become a career. He studied Industrial Design and completed a course called Entertainment Design, founded by the famous concept artist Scott Robertson. His first professional experience came when he got an internship at Pixar, where he was able to work on *Toy Story 3*. He's been working ever since.

Klimov has put his imagination at the service of both films and games, including *Brave*, *300: Rise of an Empire*, *Diablo 3*, *Starcraft 2* and most recently *Metal Gear Solid 5: The Phantom Pain*, and worked at companies like Blizzard Entertainment, Rhythm and Hues, MPC and Digital Frontier. As a freelancer, he's enjoyed working across both films and games, and tackling the individual challenges presented by each.

"They're different beasts," says Klimov. "But really, it all depends on the speed at which you're supposed to work. If they want you to crank out concepts faster that's usually more challenging because you have to balance your work, ensuring that you're keeping the quality high while still meeting the deadline demands of the project!"

ON THE COVER:
Klimov's awesome *UNIT 06-T9* battle mech showcases just how talented the young concept artist is when it comes to unique and unusual sci-fi designs.

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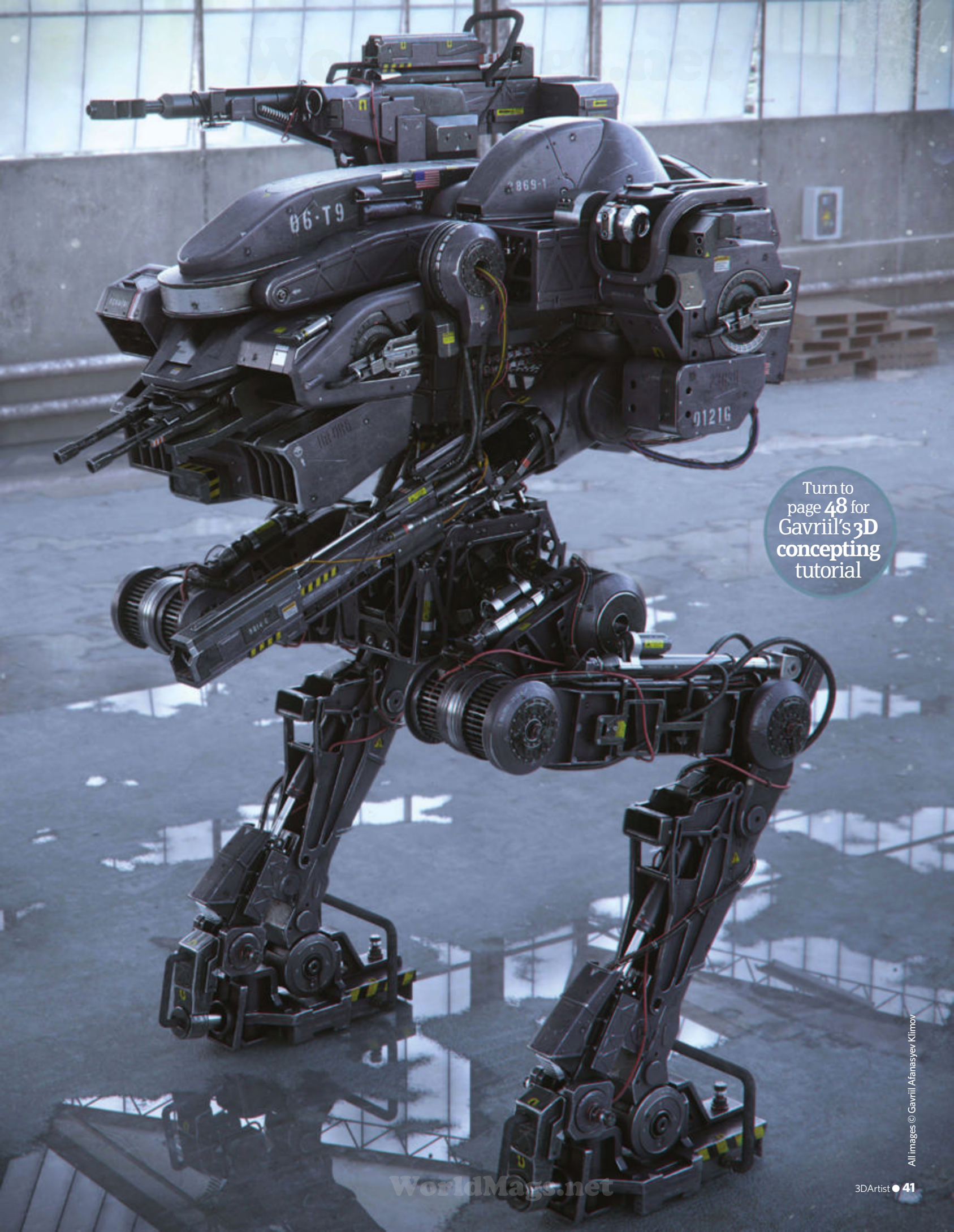

Turn to page **48** for Gavriil's **3D concepting** tutorial

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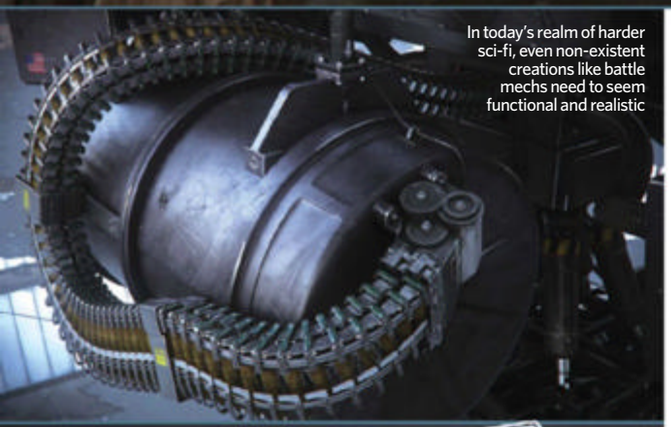
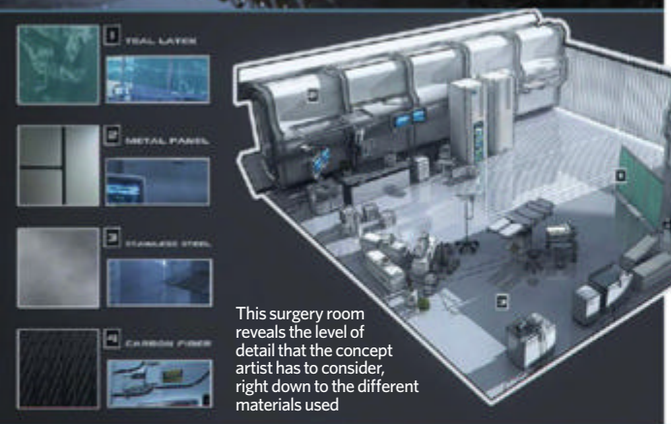
High concept: Gavriil Afanasyev Klimov

Concept art isn't just about defining shape and form, but also about establishing atmosphere and mood



In today's realm of harder sci-fi, even non-existent creations like battle mechs need to seem functional and realistic



This surgery room reveals the level of detail that the concept artist has to consider, right down to the different materials used

CONCEPT CHANGES

Though Klimov has been in the industry a relatively short time (he started at Pixar in 2009 and graduated from the Art Center in 2012), the degree to which concept art is relied on during production has already significantly increased. "Concept art has changed a lot in recent years," he tells us, "It's a field that keeps progressing at a very fast speed. In 2008 most of the work was still 2D and there was far more analogue media being used. However, today 3D has taken on a far more prominent role in the concept field. Mixed 3D/2D work is almost the norm now, and there has been an increased usage of photo textures and photo work. All of these tools have been adopted so concept artists can generate art that looks better but can also be produced far quicker. There are so many pros that I think come with doing 3D concept design, so that's what I use most in my work."

Using the same 3D packages for concept work that the modellers and animators will later use for production-ready assets means work by artist such as Klimov can be directly transferred, rather than interpreted, as they were in the days of 2D concept art. It also means that Klimov's imaginative creations will play a larger part in the end result of whatever project he is working on.

Klimov's usual approach is to go straight to MODO or ZBrush to block out his work. "I do a lot of dirty non-SubD modelling to keep things fast as I am not modelling for production. After I build the main shapes I may go in and use parts from an existing library that I built up over the years to add detail, then do a render and paint over in Photoshop. That's my standard pipeline for the majority of my concept work."

Klimov also makes use of a wide variety of programs in his work. "They are all useful in their own way – MODO and ZBrush are great for hard surface modelling; 3ds Max and V-Ray are useful when I have time to do a detailed rendering; Vue and World Machine can be used for the creation of 3D terrains to be used as plates for concept or matte work; and last but not least Photoshop is the finisher."

Which software package Klimov utilises depends largely on the project and the different demands of each. "I recently worked on some game cinematics that required a distinct look for the planet in which the story is set. The treatment was very specific towards the ground terrain, so I used Vue and World Machine together with Photoshop. Taming the procedural nodes is always one of the most challenging things I do in the concept stage, I think."

When preproduction starts on a movie or videogame, every prop must be concepted, whether that's sci-fi guns or a chair leg

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Although traditional 2D work will always play a big part in the world of concept art, 3D concepts are becoming increasingly popular

FINDING YOUR NICHE

Klimov has already achieved incredible things in his career and he currently holds the prestigious position of Kojima Productions' senior concept artist, working on the latest instalment into the long-running *Metal Gear Solid* franchise. As his career continues to develop, Klimov intends to find a discipline in which to specialise – in his case, likely that of industrial design.

"There's definitely a large range of concept artists working in the industry," he explains. "Most people tend to specialise in something. Some people are just creature designers, some are environment artists and so on. In order to become the very best at something it takes a high amount of specialisation, which is why you're seeing less and less general artists and more specialised ones. An amazing creature designer may not understand environment perspective, just like a hard-surface concept artist may not understand anatomy. So no matter what you do, you want to make sure to have a deep knowledge of those subject matters that are required in your specific area of expertise."

Also, in today's world of extreme detail, sophistication and photoreal work – both in digital matter work and in 3D animation – there is really nowhere to hide poor work. Art that looks decent from a distance but poor close up simply won't do. "I think as previously stated there is a big shift in the media used to create concept art," states Klimov. "More 3D mixed with 2D and pure 3D will become the norm. Programs like ZBrush are always innovating the way designers can create something while ensuring the technical aspects stay simple to understand and, as such, allow for a greater degree of creativity. Painting will always be required, of course, but the sheer amount of 3D concept design will grow because it solves problems that traditional concept art has. Many times a cool-looking mech is actually impossible to model in the 3D pipeline later on. Sometimes a cool suit has a ton of issues once the ZBrush artist starts sculpting it.

> "IF YOU UTILISE 3D FROM THE START OF THE CONCEPTING PROCESS, YOU CAN KEEP THE DESIGN HONEST, NOT TO MENTION HAVING A BASE MESH FOR THE 3D PRODUCTION TEAM TO START OUT WITH"

"Doing 3D concept art keeps the design honest. You can only cheat a certain amount. Recently I was hired to re-do 2D concepts for a game that had already been created by an artist and although they certainly looked cool, almost all of them could not function when in-game.

"I redesigned these assets from scratch, meaning the company in question had to spend double the time and double the money. If you utilise 3D from the start of the concepting process, however, you can keep the design honest. This will be something that will become increasingly popular in the future, I think. Not to mention, having a base mesh for the 3D production team to start out with will always be helpful."

» DESIGNING THE FUTURE

Having majored in Industrial Design, and with so much of the concept work out there being science fiction, Klimov is perfectly placed to imagine and design the machines of the future. Robots, cars, spaceships and guns are plentiful in sci-fi and even if they're not centre-stage, these details are vitally important in determining the look and feel of the world. However, despite his experience, Klimov's process still requires a lot of research: "I look at a lot of references, model some components based off existing stuff that I see, like Boston Dynamics robots (**www.bostondynamics.com**), and keep a big library of parts to use later on. Overall the process is pretty straightforward: make the big shapes first, then detail them, refine those shapes and use your library to kitbash some details here and there. Keep the scene clean and organise materials early on so you can add the shaders with ease later on."

Klimov's own background in industrial design is probably what gives his prop work such power

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High concept: Gavriil Afanasyev Klimov

When it comes to concept work, speed is key. However, this cannot come at the expense of overall quality

NATURE OF THE GAME

One of the most creatively inspiring aspects of being a concept artist should be the constantly fresh and varied projects you work on, but according to Klimov, the reality is that it falls largely into two categories: fantasy and sci-fi. Assuming that the real world doesn't need designing, these are the two areas that most films and games need world-creation for, and – at the moment at least – one of them is definitely outgunning the other. "In terms of content there are a lot of sci-fi projects coming out and an increasing demand for the genre. My last six projects bar one have all been sci-fi. If you look at community sites online there's also a large abundance of sci-fi and futuristic work, where a while back I remember fantasy was still holding up pretty decently."

A sense of creative stagnation isn't the only issue facing concept artists today – being a part of the VFX industry at all has had its fair share of problems as of late. Having worked as a freelancer for the troubled Rhythm & Hues for stretches in both 2012 and 2013, Klimov has experienced this first hand: "Yes, working in VFX studios has definitely became harder for a lot of reasons," he tells us. "Overall there's a trend of going for less full-time positions and more towards contract or freelance work. Also, there has been more outsourcing for such jobs,with the work executed off-site for less money."

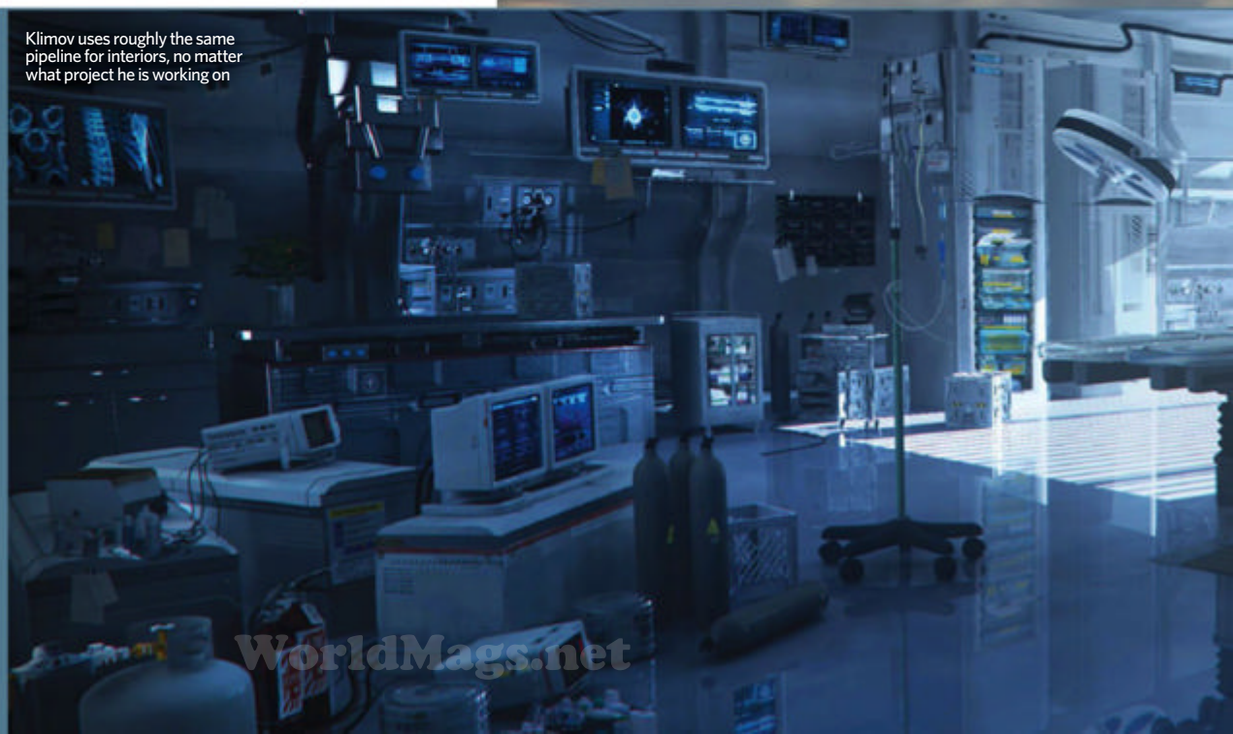
However, the advice you'd give for any freelancer holds true: produce good work, and keep working hard. "It's a clichéd thing to say," states Klimov, "But if you keep up with the latest trends and make sure you're on top of your game, you will always be able to find freelance work. Just deliver the best that you can every time and before you know it a one-time client will become a regular one. Once you have many regular freelance clients, the ones that pop in and out are just an added bonus on the top of the rest of the work. Make sure to do great work for the people that hire you and always give your best."

It's certainly paid off, with Klimov now working hard at his new position at Kojima Productions in Los Angeles. With Kiefer Sutherland announced to do voice and mocap work for the next instalment of *Metal Gear Solid*, titled *The Phantom Pain*, this high-profile project should provide plenty of opportunity for Klimov to experiment with his style, while making an even bigger name for himself for future work opportunities.

There has been an increasing demand for sci-fi concept work in recent years

» KLIMOV TALKS INTERIORS

"I start by blocking in the scene with 3D modelling," says Klimov of his interior concepting process. "I think of it as an actual set and plan the top view first. After I am satisfied with the base model, and depending on how much time I was given for that specific shot, I keep adding more details in 3D or I jump in Photoshop for the paint over. It's pretty much the same pipeline for the rest of all my work. Hard-surface modelling is pretty straightforward, and most of the time I use a combination of tools, bevelling, extrusions, bridges, edge slices, cut slices and so on. A good tip is to not necessarily enter SubD unless you are making a model for production. For concept work you may want to keep everything as straight polys."



Klimov uses roughly the same pipeline for interiors, no matter what project he is working on

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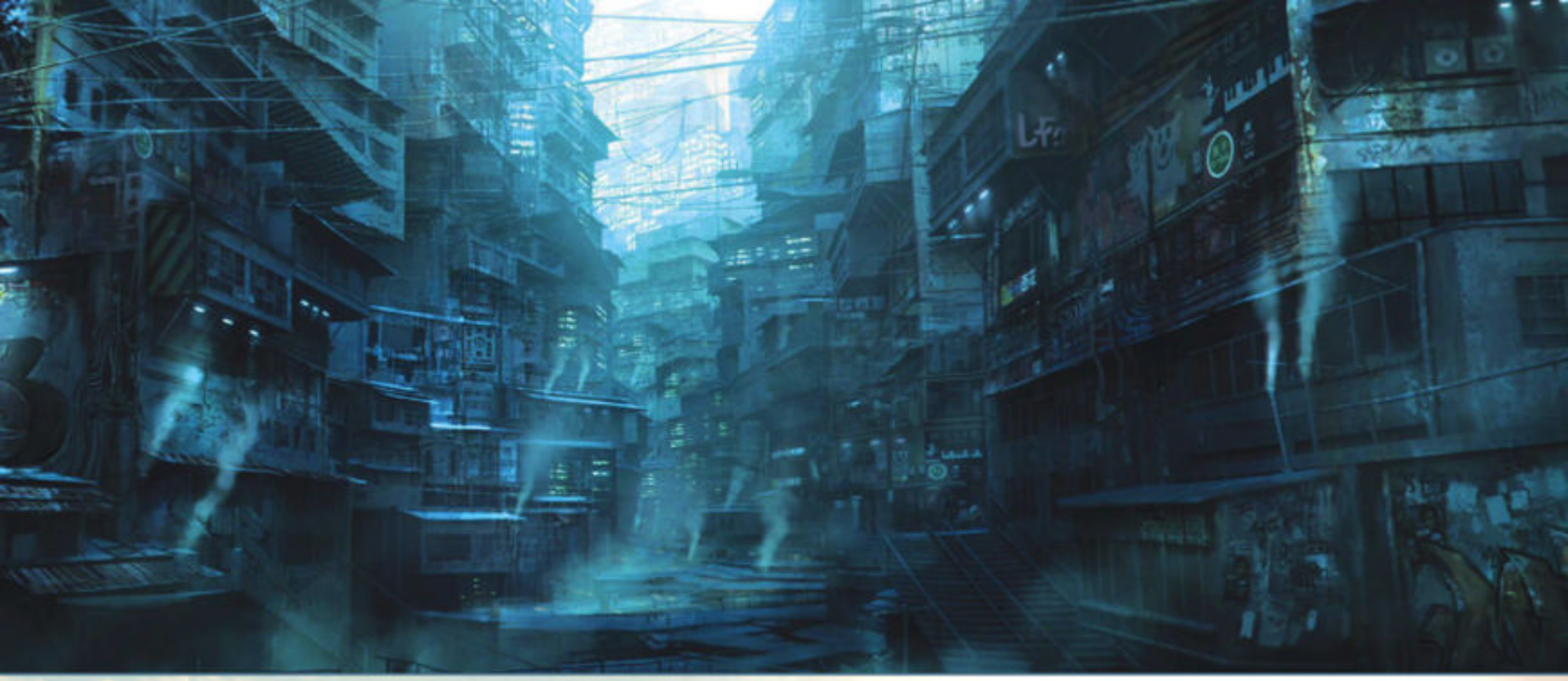
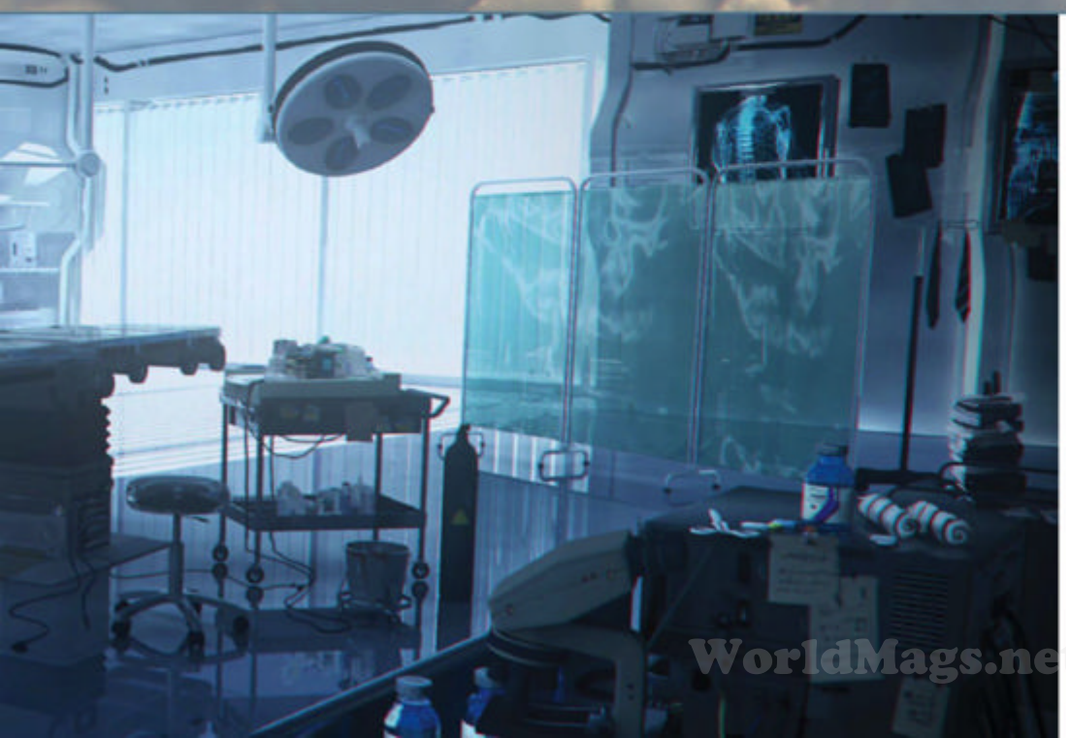


As in any CG discipline, constant hard work and continual learning are key to making sure you land the best jobs



> IT'S A CLICHÉD THING TO SAY, BUT IF YOU MAKE SURE YOU'RE ON TOP OF YOUR GAME, YOU WILL ALWAYS BE ABLE TO FIND WORK. DELIVER THE BEST THAT YOU CAN EVERY TIME AND A ONE-TIME CLIENT WILL BECOME A REGULAR ONE

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High concept: Gavriil Afanasyev Klimov

3D concept work isn't just about defining broad strokes – details are just as important

The futuristic imagery in the *MGS* series has always been of an incredibly imaginative standard, and is perfectly fitting for Klimov's brand of sleek sci-fi design

METAL GEAR SOLID V: THE PHANTOM PAIN

In May Klimov started in his new role, senior concept artist for Kojima Productions, working on the *Metal Gear Solid* series. The next *MGS* game, *The Phantom Pain*, will be out in early 2014. Kiefer Sutherland was recently confirmed as the new voice of Snake, as well as doing motion capture for the character. Kojima Productions is using its newly developed Fox Engine for *The Phantom Pain*, which will be used to power the game's new open-world approach to gameplay. As ever, the game is full of futuristic sci-fi tech, all of which requires an in-depth concepting process before it is cleared for presentation in-game.

SEEKING INSPIRATION

Inspiration can be a fickle thing for any artist, but in Klimov's line of work finding it can be even trickier than it is for others. On the one hand, concept artists are given the opportunity to design entire worlds; an exciting task to say the least. However, concept artists must constantly find ways to bring a fresh and unique twist to the key imagery that constantly reappears in sci-fi, whether that's spaceships slowly traversing the edges of ancient galaxies, or dystopian rain-drenched cityscapes. Furthermore, they must do this while staying within the confines of the brief supplied to them by the client. It's no easy task, that's for sure.

Where Klimov seeks his inspiration differs from project to project: "It depends a lot on what I'm designing," he tells us. "I tend to browse my reference folder based on the brief I receive and start on some research. I also often try to come up with a back-story, or a narrative, before I start the design itself. By providing a story and a reason for your image, you will find it becomes more unique than others that are simply made up as they go along."

For Klimov, inspiration comes from a great many sources and not simply from the same tired movies and pop culture reference points highlighted by many. "Inspiration comes from everything," he tells us. "You might find a great Tumblr with a collection of beautiful pictures and stuff that isn't even related to your project, but gives you ideas nonetheless. Inspiration can also come from fine art, fashion or music. Looking at fine art images helps you form ideas, while listening to a particular song while modelling may inspire certain shapes that hadn't occurred to you before. I absorb ideas from everything."

Ultimately, it all comes back to those art books that Klimov looked at, when, as a student, he realised that someone had to paint all that art for the movies he loved. It was one artist's inspiration passing to the next. "I was blown away by the beauty and the imagination of those artists and the idea that you could do that for a movie was just too exciting for me." Now it's Klimov who is creating the work that will inspire the next generation of concept artists. We can't wait to see where he goes from here.

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YANA B3E
COMPACT ASSAULT RIFLE

Gavriil Afanasyev Klimov is a concept designer working in the videogame and film industries. He currently holds the role of senior concept designer at Metal Gear Solid creator Kojima Productions. Gavriil has generated concepts for many weapons over the years, all of which marry a sense of military functionality with sleek sci-fi design. You can see more of his work in our artist interview on page 40.

With the Disc

Tutorial files:
- Tutorial screenshots

Concept

Here we'll explore the workflow for producing a weapon concept using MODO. Though 2D applications are also used, we'll demonstrate how you can produce effective concepts in 3D.

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Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Gavriil Afanasyev Klimov

Personal portfolio site www.hexeract.org
Location USA
Software used MODO, Photoshop
Expertise 3D concept design for the videogame industry

Create sci-fi weaponry

Yana B3E Compact Assault Rifle 2013

"Concept futuristic weaponry designs using MODO and a variety of hard-surface modelling techniques"

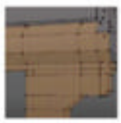
Gavriil Afanasyev Klimov is currently senior concept designer for Kojima Productions

Over the following pages we're going to take a look at concepting distinctive sci-fi-style weaponry. To achieve the final look we'll mainly be working with MODO's modelling tools, before moving to Photoshop.

During the steps I'll cover the major stages used in my workflow when creating similar concepts for movies and videogames. I've chosen to focus on a prop – what I call the Yana B3E Compact Assault Rifle – because it embodies all the key components of the 3D concepting workflow. However, this same process can be applied to a vehicle, a robot, or even an entire environment concept.

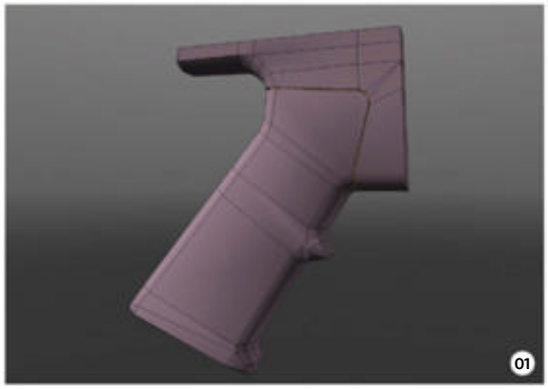
To begin we'll need to build up the mesh in 3D, apply shaders, perhaps texture the model, then render it and move to the final post-production stage in Photoshop.

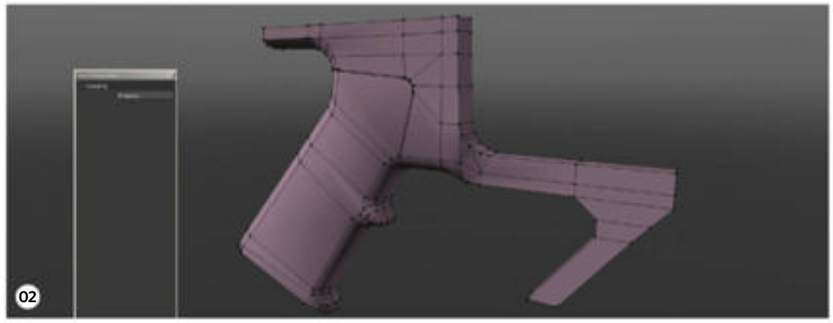
This workflow is useful for any 3D concept artists out there, as well as anyone who wishes to develop their hard-surface modelling skills.

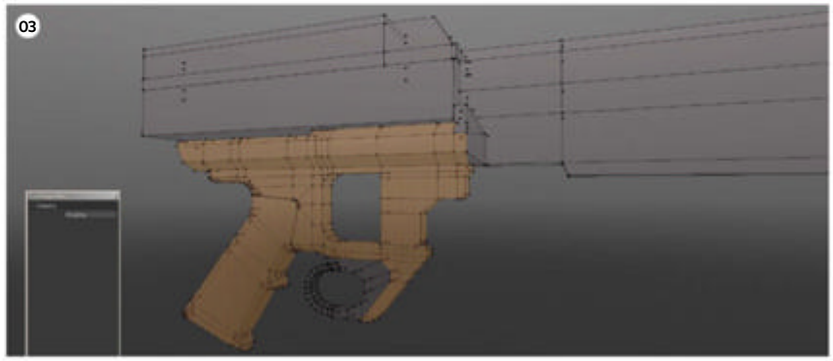


Start with broad forms

Block in the basic shapes of your weapon as a foundation







01 Block in the handle I always prefer to begin with the handle when working on the design for a gun, starting from a simple cube and blocking in the shape of the grip. Even when working on these early stages of the project, it's best to add some of the cut lines, as this saves time later on and makes the overall process much smoother.

02 Continue to form the shape Most of the functions used in the modelling stage are the same and consist of mixing Extrude, Bevel, Inset and Edge applications – all combined with the Move, Rotate and Scale tools. These are straightforward hard-surface techniques. The key here is to use your own imagination and creativity to develop unique and interesting shapes.

03 Use big shapes Now continue to block in the large shapes by simply extruding and slicing the mesh where you plan to have different components or cut lines later on. This ensures the mesh is somewhat more organised for the detailing work to come.

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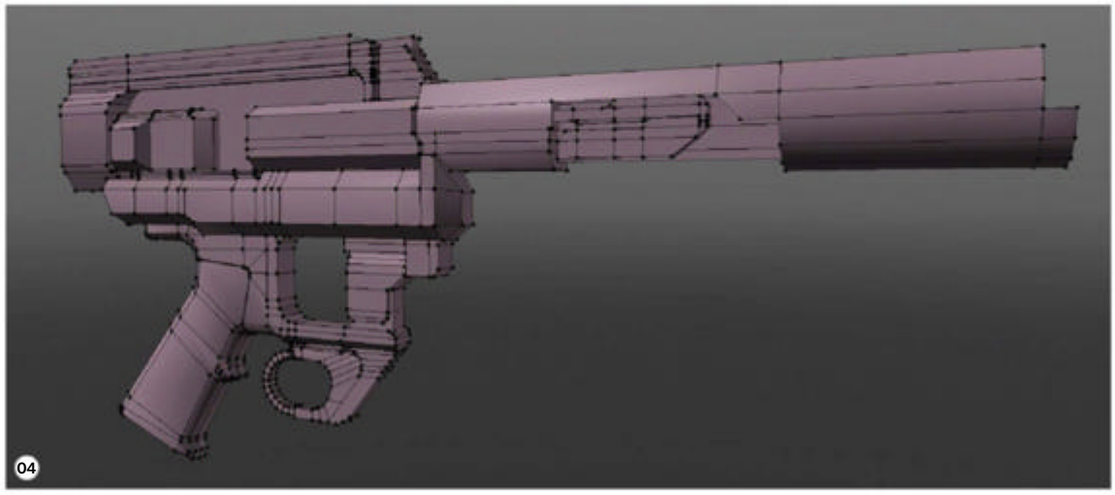
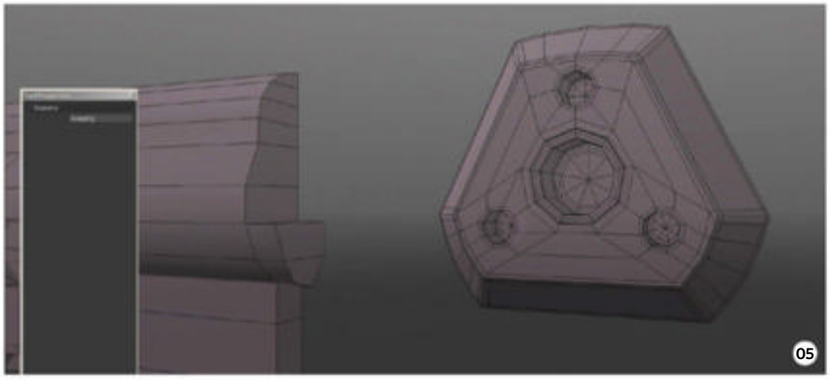
Add more elements

Develop the design and apply unique details

04 Experiment with your concept

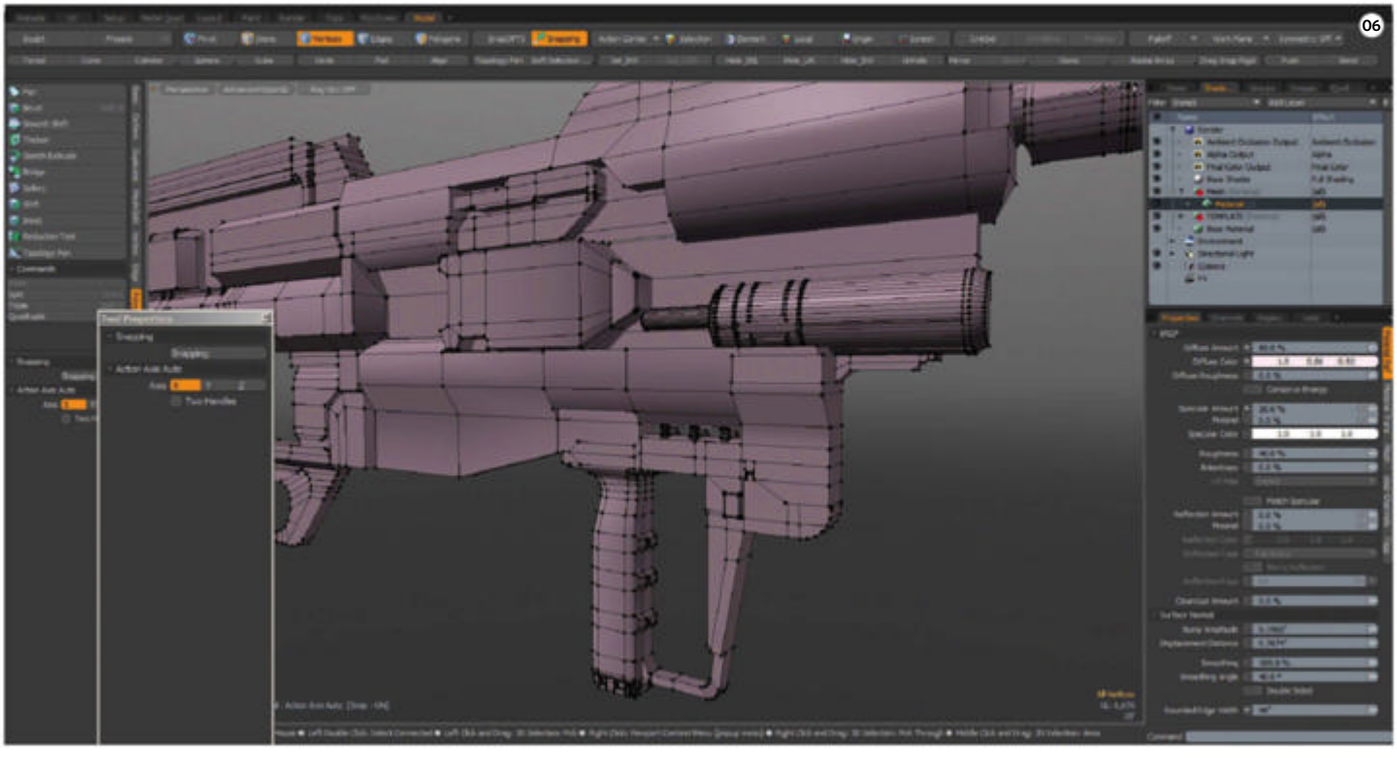
Continue to pull out the main shapes of the model by extruding, slicing and moving around edges and vertices. At this stage you're free to play around with your design and make a truly individual concept. Personally, I'm not always sure of what the end result is going to be, so I simply experiment with the various elements until I find something that works. If you're stuck, find a couple of images to refer to.





05 Attach a silencer At this point you can build the front silencer using the Drill/Stencil function to make the small holes in the shape. Try to think of different ways to make the objects more interesting. A usual cylindrical silencer is instantly recognisable, but sometimes making things look slightly different is a great way to end up with a finished product that stands out from the crowd.

06 Add more definition This is another opportunity for experimentation, so keep blocking out the medium-sized shapes and add more of the major details. I tend to go with the flow here, with nothing specific in mind other than making sure everything looks like it works together.



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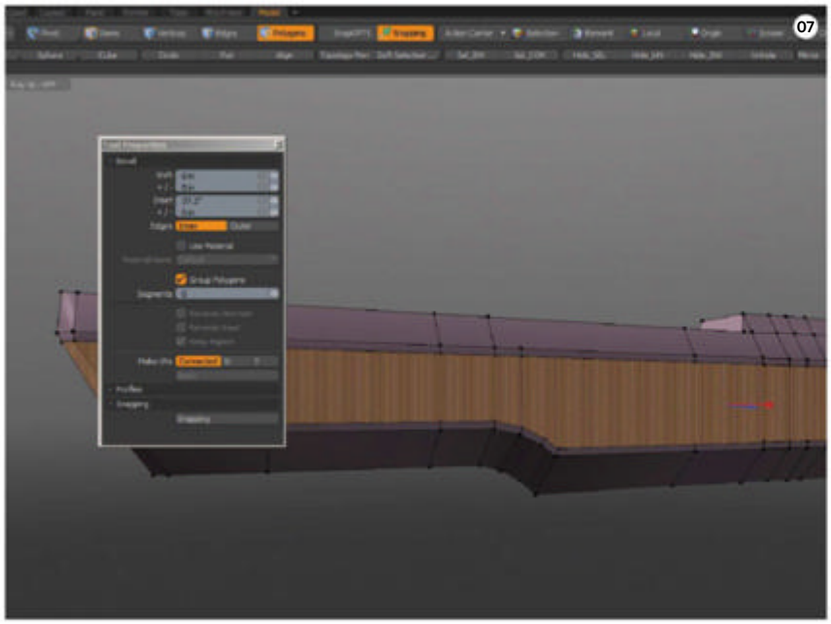
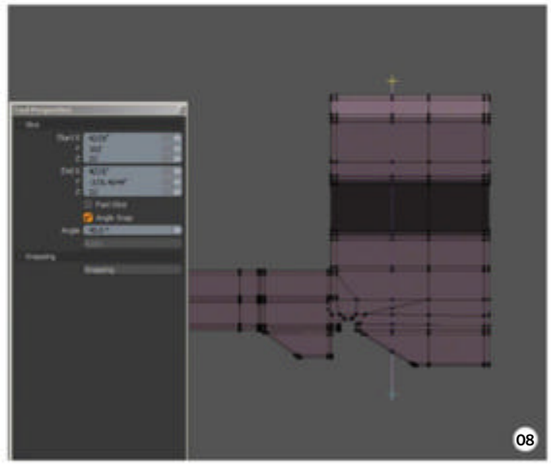
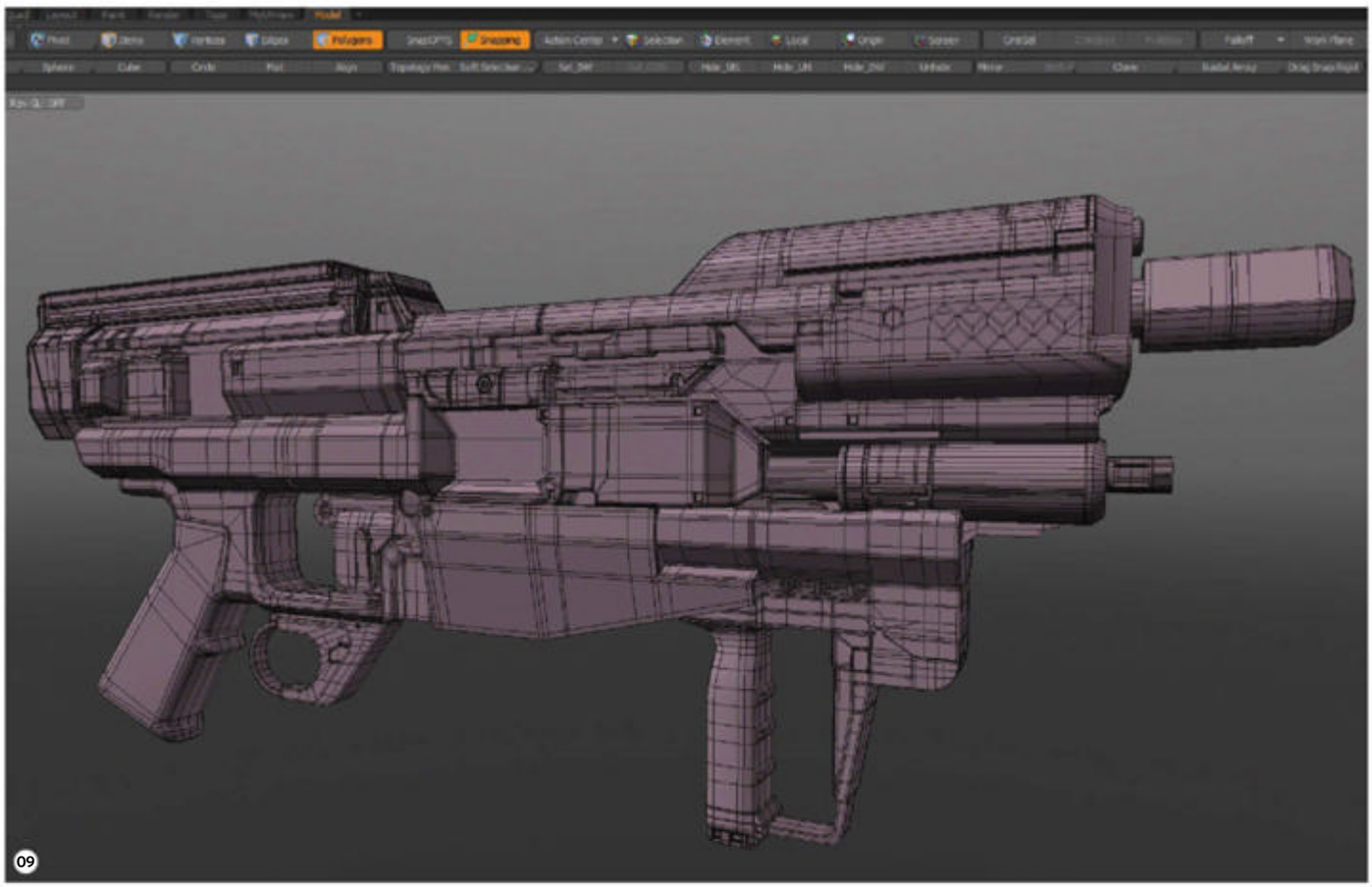


07 Build the side panel Now grab all the faces needed to add an edge loop to and inset them. This gives an instant edge loop along said polys and enables us to just fix the ends (instead of cutting all along the polys' edges with the Slice function). This is a simple but very effective technique.





08 Slice it up I often use the Slice tool by simply entering Orthographic view and using it to slice an edge all the way across whatever is needed. This is an ideal method for moving polys and edges, as well as producing insets.

09 Apply more detail At this point the model is almost finished, but it's still missing some crucial details. The concept needs to appear interesting, but functional, so add small aesthetic elements such as grips and attachments that give the weapon that extra something. As a concept artist I have a kitbash library stocked full of smaller assets, which enable me to avoid spending too much time on this stage.

Finishing the model

After Step 9 the bulk of the model should be complete and we're past the most difficult and tedious part of the job. Whenever I finish the mesh, I consider 80 per cent of the job to be done, as texturing, lighting, rendering and post-production all tend to be quicker and much more fun to execute (apart from when using UVs, which for most concept projects I avoid).

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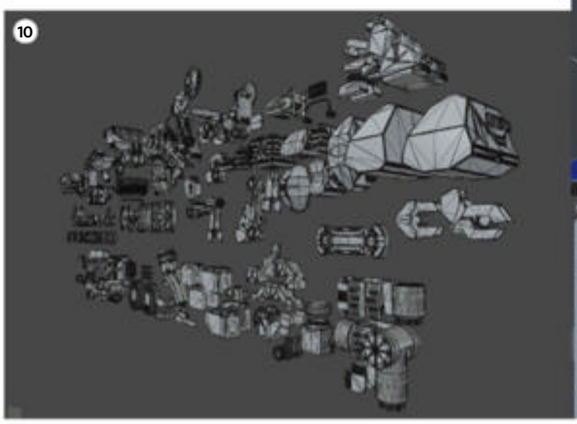
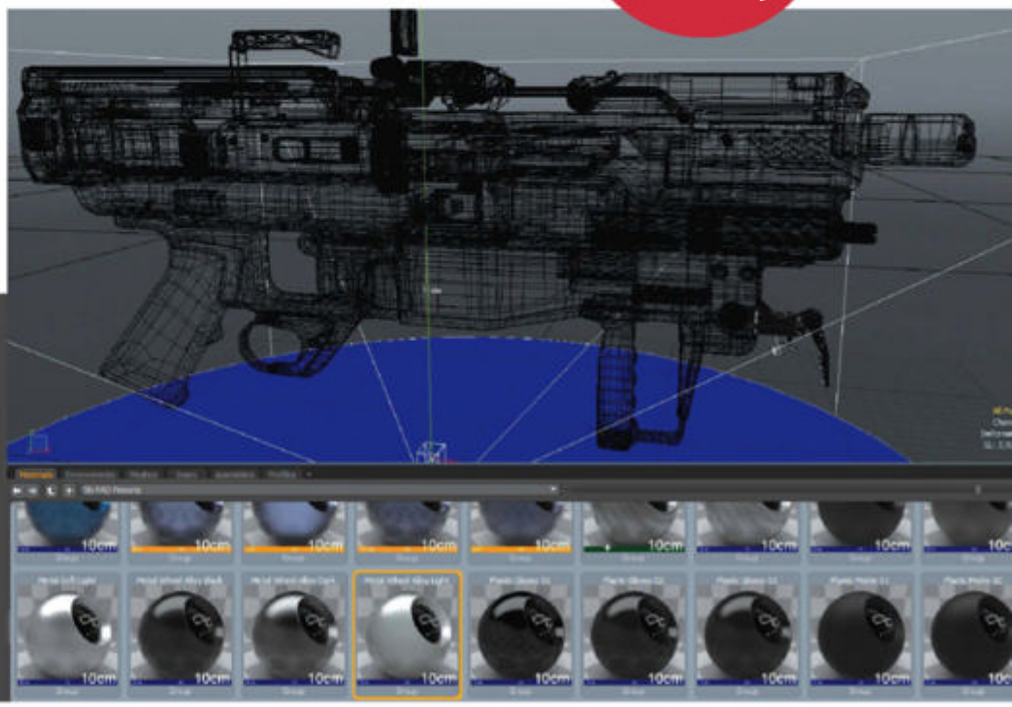
Move to post work

Finish with kitbashing and Photoshop

2 minutes render time
Resolution: 2,454 x 1,785

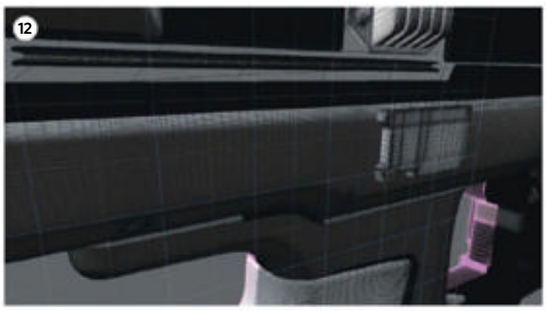
10 Kitbash and shading At this stage I pull up one of my kitbashing libraries that has been designed specifically for props and weapons. These are mechanical parts that are easy to fit here and there by playing around with them. Having purpose-built libraries for detailing is ideal if you want to save time in the final stages of modelling. After all the detailing is finished, move to the Render tab and, using the MODO Live preview, start selecting the different objects and assigning them with the materials you wish to be applied.





11 Test with HDRIs I prefer to check the look of the gun in progress using multiple HDRIs for the background, just to keep it in check under different lighting scenarios. I believe it's very useful to see how the model looks in different lighting setups, as usually a good model can hold up nicely in almost every situation.

12 Freeze the geometry Try freezing the geometry when you're about to render, so the mesh gets a higher density and becomes smoother. At this point you don't have to be too concerned about the poly count, just keep looking for the utmost quality in the final render.



Working in 2D and 3D

The ratio of 3D vs 2D in my work is often decided by the deadline and the type of work I'm doing. If I have to deliver a whole environment in a very short period of time, it's very likely the Photoshop percentage will be higher than the 3D one. On the other hand, when I'm given a lot of time, I prefer to work with 3D software as much as possible.

13 Set a scene For most prop and weapon shots I use many of the great presets that MODO has on offer. In this case the scene used to render the gun is from the Studio Environment Set 1 from 9b Studios. As far as the rendering is concerned, a powerful workstation will only take a couple of minutes to render to a finished quality.

14 Finish in Photoshop After producing the raw render, you can bring it into Photoshop for the final touches. These include applying an aging effect, additional texturing, graphic design and so on. After modelling, this is the part that is most enjoyable and presents the most creative freedom.

• **DID YOU KNOW?** • All tutorial files can also be downloaded from: **www.3dartistonline.com/files**

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I made this...

Incredible 3D artists take us behind their artwork

Artist info

Stefano Tsai

Website www.stefanotsai.idv.tw
Country UK
Software used 3ds Max
Bio Stefano has been working in the videogame and entertainment industries since 2001. He currently works at The Creative Assembly

> Don't be hesitant when it comes to increasing contrast and saturation. It may look strange in the beginning, but in the end it will give the image a better sense of impact and narrative

Factory of Enforcement Vehicles 2013

This image started with an awesome concept image of a bike from Bradley Wright. At first I modelled only the bike itself. However, by the end I was having so much fun I created all of the environment surrounding it, bringing it the entire scene to vibrant life.

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Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Mathieu Assemat

Personal portfolio site
www.moving-picture.com
www.assemat-m.com

Location London

Software used
Maya 2012, nCloth

Expertise Mathieu specialises in creature FX, as well as cloth, skin and fur simulation

nCloth simulations with MPC

Character Cloth 2013

"Here you will learn how to produce convincing cloth simulations on the Hollywood-VFX level"

Mathieu Assemat is a lead technical animator at MPC

If you've ever wanted to master a workflow for creating character cloth, look no further. While we won't be running through each miniscule solution, here you will learn a way of working that can be applied to any character you create. We'll look at utilising nCloth and exploring any potential pitfalls you may come across along the way. With this guide you'll soon be able to make realistic cloth simulations in the same manner as we do at MPC.

Plan your design

Enter the world of simulation

01

02

01 Pick your character This guide doesn't relate to a specific character, as I'm sure you have your own in mind that you need to clothe. However, Maya has a library called the Visor, which includes some mocap examples you can work with (Window>General Editors>Visor). Before working with animation we'll first work on a static model.

02 Gather some references When it comes to cloth, it's crucial that you have a good understanding of the behaviour of the fabric you want to re-create. Researching any suitable material on the internet will help, but it's also important to look at a real person in full motion. For example, if you were creating a pair of jeans, they could either be worn in a skinny style or slightly baggier. Why not be your own model? Get in front of the mirror and try out different styles.

Test out your sim

Enhanced simulations can often become extremely data-heavy, so to fully understand the attributes, and anticipate what's needed, I keep a Maya scene at my side, with a cloth plane point constraint on each corner to simulate in real-time. This way I can properly test out my settings.

03

03 Understand the nCloth solver Before starting, remember that Maya Help is a good friend and it'll provide you with some useful information. I always have the documentation by my side as I work and it will help you a great deal if you read the relevant information before you begin work.

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With the Disc

Tutorial files:
Mathieu has provided screenshots of his steps and settings, as well as a video clip of his character in action

Concept

To demonstrate the cloth simulation workflow used at MPC we're using this basic character model, including a jacket, shirt, jeans and shoes.

Learn how to

- Understand cloth physics
- Fix common problems that arise during simulations
- Use nCloth to re-create a realistic set of clothing for any character model

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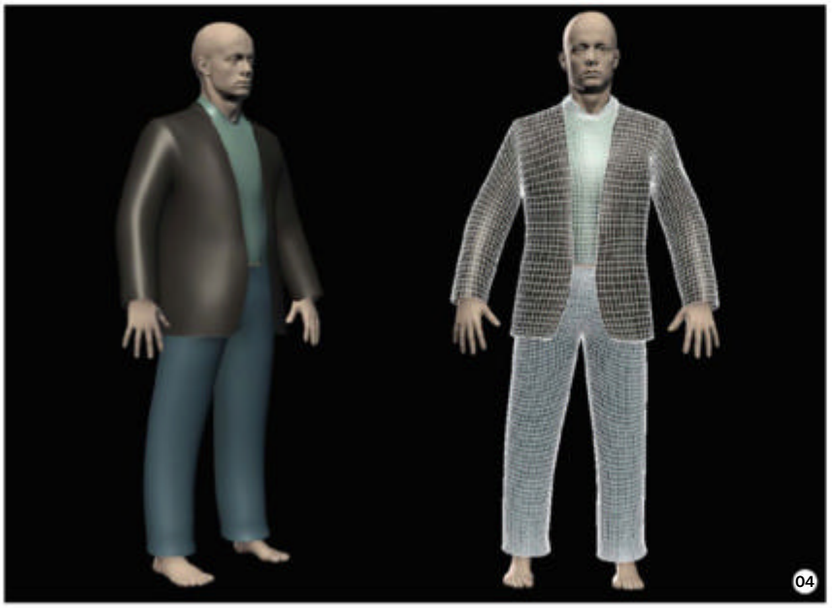
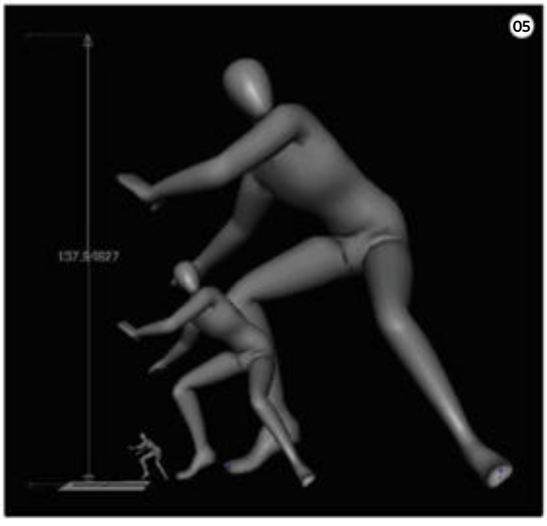
Set up your cloth

Assign the values for your material, including scale and weight



04 Simulation meshes When clothing a basic biped character, applying each piece of cloth should be relatively simple, but try not to add too many details or you'll lose them in the simulation. Keep in mind that you need at least three edge loops to create a wrinkle and three points are required to make a curve. By looking at your references and at the level of detail you want, you should be able to tell how dense the mesh needs to be. Here I want quite a realistic cloth, while keeping a decent simulation time, so I adapt my resolution to what I think is necessary for the shirt, blue jeans, and jacket. We'll refer to these meshes as 'simulation meshes'.

05 Space Scale Once you have your simulation meshes ready, you can convert them into nCloth (select the mesh and go to nCloth>Create nCloth). Your body can now become a collider (nCloth>Create Passive Collider). My character is about 1.80 meters tall, which is 18 Maya Units. nCloth interprets Maya's units as meters, so in my case 1 Maya Unit equals 10cm. To sort this out I can set up the Space Scale in my nucleus to 0.1. If you use centimetres as units you should put 0.01. Now you can also set your start frame.

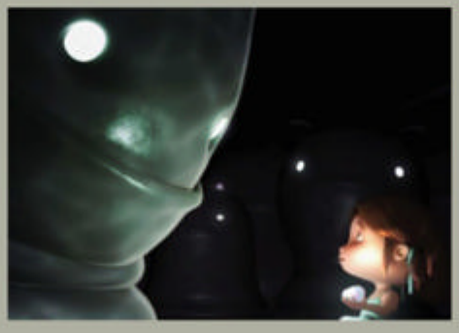


06 Explore the nCloth presets
Maya comes with a lot of nCloth presets, so let's give each piece of cloth a preset (the Preset button in the Attribute Editor) that we think may work. From now on the jeans will use the preset Heavy Denim, the shirt will use the T-Shirt preset and the jacket the Thick Leather preset. These may not work amazingly straight out of the box, but they serve as a good foundation. You can keep your own presets later to save some time in the future.

Artist showcase

Mathieu Assemat

After completing Art Studies and later a CG Animation course in France, I began my career working in Paris. Soon afterwards I moved to London to work at The Mill, where I specialised in cloth simulation and rigging. Now I'm lead technical animator at MPC, working on movies such as *Harry Potter and the Deathly Hallows*, *X-Men: First Class*, *Life of Pi* and *World War Z*.



Luminoir **Maya (2009)**
This was a short movie for a school project. © ESMA – 2009. All rights reserved

Fireman robot **Maya (2008)**
Another school project where I completed the design, modelling, texturing, rigging and animation

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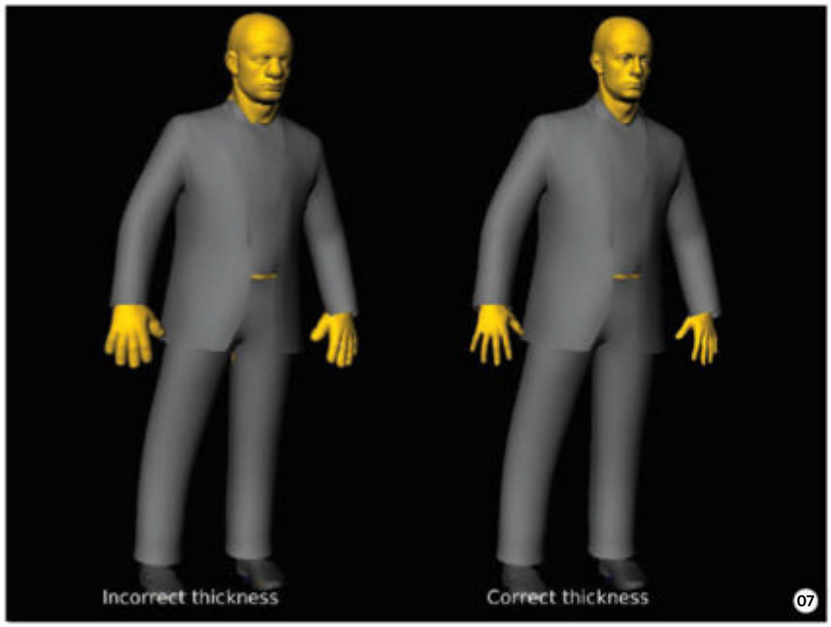
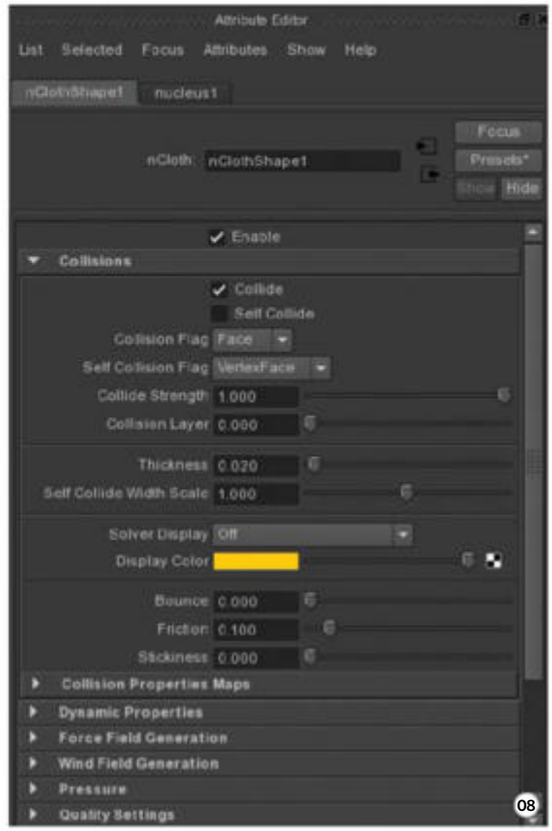


07 Adjust the body's nRigid node

When you created your collider it also produced an nRigid node. The default value in the Thickness attribute is often high, so you can display this by selecting Collision Thickness in the solver display. Set the Thickness to a value that makes your character bigger by just a few millimetres. As for the other attributes, for the skin I prefer using a Friction of 0.6 and a Stickiness of 0.05. This creates enough friction and doesn't look unnaturally sticky.

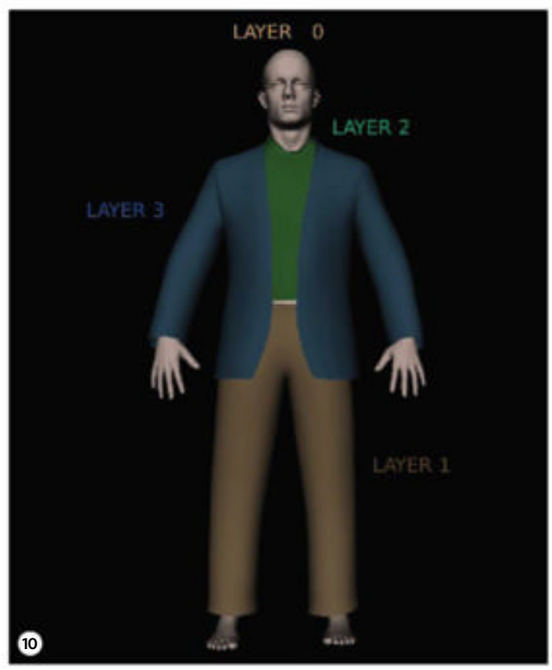


08 Prepare the cloth for testing Now we want to optimise the simulation speed a little. For this I usually untick the Self Collide box on every nCloth, which should also have an appropriate Thickness set. Don't make your cloth look thicker with the intention of improving the collision, as this just makes it unstable. The Substeps are the number of times Maya will calculate a frame, so put the Nucleus Substeps value to 10 to start with. If your value is too low, the behaviour of your cloth will be radically different. If required, I only increase to just over 10 for stability purposes.

Iron creases

If you have a loop where the edges are closer to one another when building your simulation mesh, this will affect the simulation and create a harder crease. In the case of a suit trouser, for instance, you may want to have more loops on the front to simulate the effect of an iron crease.

09 Add constraints Now you can go to your start frame and test the results. If, like me, you have a pair of trousers or even a cape, you might notice that the trousers fall down to your character's knees, or the cape might not be attached to the body. To avoid this, you can add point constraints, by first selecting the vertices where the belt should be. In the example of the jeans, you can add the body to the selection and go to nConstraint>Point to Surface to attach it. However, now you will see there's some space between the jeans and the body. If you reduce the Rest Length value in your constraint, the jeans will get closer to the body. I set it to 0.1 in this example. If your jacket slides, you should consider adding a constraint to the collar.



10 Collision Layers It's more than likely that your character has more than one piece of cloth to deal with, in which case they will collide with one another. Theoretically this is a nice effect, but in reality it can be hard to achieve a stable simulation this way. Luckily each nCloth or nRigid node has a Collision Layer attribute. An object is only able to push other objects in an equal or higher Collision Layer level. For example, an object in collision layer 1 will push an object on collision 1 , 2 or 3, but not an object on layer 0. However, it can be pushed by an object on collision 0. The Collision Layer Range in the Nucleus node specifies how many layers above an object can be pushed by another. With this logic in mind, my body will be layer 0, jeans layer 1, shirt layer 2 and jacket layer 3.

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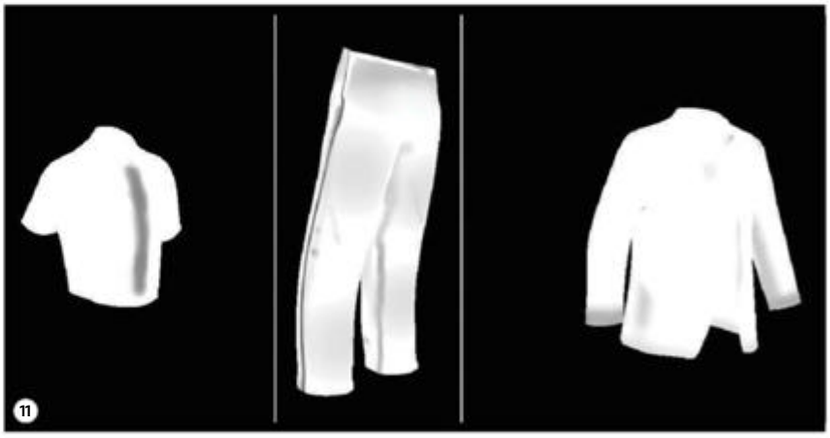
Begin polishing

With your initial simulation complete, it's time to refine it

11 Use a Rest Length map A Rest Length map will enable you to sculpt the cloth. By default the map is all white, but if you paint some darker zones, it will shrink the cloth. With extremely dark tones the cloth with take on an elastic texture. I usually paint the seams of clothing at a value of 0.9 and add some stains into the white to bring randomness to the fabric. To paint it, Ctrl/right-click on the cloth geometry and select Paint>nCloth Vertex Map>Rest Length Scale. The maps in the example are contrasted so you can see them clearly.

12 Rest Length Scale The Rest Length Scale in the nCloth is a multiplier of the map we've seen above. Is the cloth too baggy? You can reduce this value and it will all shrink. I set up all my Rest Length values to 0.95 to shrink the pieces of cloth, as I went large in my model to avoid collisions.



13 Use Rest Shapes The Rest Shape is a Maya mesh that your cloth tries to match when no forces are applied to it. You can sculpt details in a Rest Shape to add some detail. Stop your simulation at an optimal frame, then duplicate your cloth to have a static mesh and sculpt on this. I go through this process a number of times to add detail. You can also connect your new mesh as a Rest Shape by selecting the mesh, adding your matching nCloth node to the simulation and going to nMesh>Rest Shape>Connect Selected Mesh to Rest Shape.

The presets

nCloth uses a direct scaling relation, so when you create a cloth it'll be set to Link, meaning that all your attributes will be directly related to the Vertex Density of your mesh. When using a preset, this value is set to Object Space, meaning that the Vertex Density has less importance and your settings can be used on another piece of cloth. You can set this value to World Space, which can be faster in older versions of Maya. Also, try dividing the Mass by 4 or 5, as when in motion I often find the mass is too high, creating too much inertia.

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Test your results

Now it's time to test the cloth with an animation

14 Adjust your values Now you can try tweaking the cloth to your taste. If you want it to have more creases, try reducing the Bend Resistance attribute. If it stretches too much, increase the Stretch Resistance. There is no single way of doing this, however, so it's always best if you refer to Maya to remind yourself of the attributes available. Here you can see the various values being used. Similar pieces of cloth can still differ greatly after tweaking these attributes!

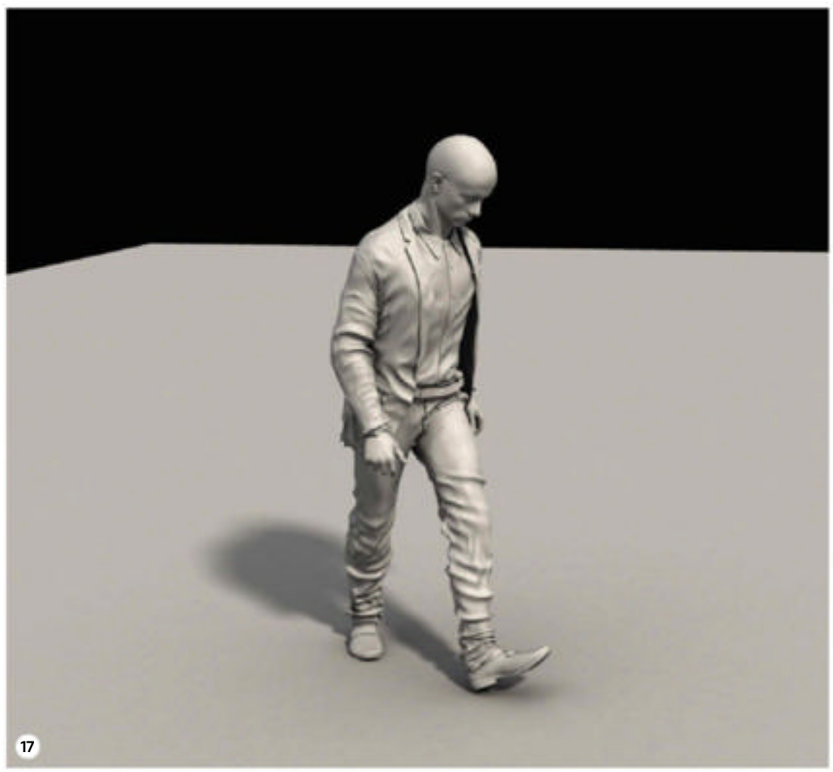
15 Test the animation After a few hours of fine-tuning, your cloth should look quite good, so now it's time to try it out on an animation. Set the Frame Range and the starting frame to where your animation begins. You'll find the results won't always be the best from the first play. Here everything ended up a bit stretchy and was moving too slowly, so I reduced the Damp value to fix the speed issues (too much Damp and your cloth looks like it's underwater). I also increased the Substeps and Stretch Resistance to prevent the cloth from stretching too far. More calculations produced a stable simulation. My Substeps are set at 26, which is the final value.

16 Hold the details At this stage some nice details will appear and you may want to keep hold of them, so you'll need to build them into the fabric. The attribute Restitution Angle in the nCloth defines an angle after which the cloth can't go back to its initial position. Lowering this value enables your cloth to hold more detail. In this case I set a default value to the shirt, 40 to the jeans and 20 to the jacket.

17 Extra modelling We now have a single-sided mesh, but we can still add details such as pockets, buttons, belts and so on. Starting from a duplicate of your original sim mesh, add all of the extra details you want and use the Wrap deformer to attach this mesh to your simulation mesh. You will now have everything moving, so details can add a lot.

Limits of the simulation

As with every tool that uses a lot of CPU resources, we have our limitations here and a slow simulation can become unmanageable. Be careful when adding detail with textures, displacement and even modelling on top of your simulation.



I made this...

Incredible 3D artists take us behind their artwork

Artist info

Marek Denko

Website www.marekdenko.net
Country Slovakia
Software used 3ds Max, V-Ray, Photoshop
Bio Born in 1980 in Slovakia, Marek established the NoEmotion studio, located in Prague, in 2007

> Once I was done with the basic composition, the piece became about finding nice ideas. I've collected over 800 visual reference files during the process. Having such a large library was a great help to put details wherever I needed

Rooftops, Rockets and Adventures Beyond 2013

I've always had something of an interest in space, science, exploration, astronomy, rockets and other similar things. Because of this, I wanted to create a nice and inspiring illustration for my three little kids, so they can look up and dream with their innocent minds.

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Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Marcello Baldari

3DArtistonline

Username: Marcello

Personal portfolio site www.marcellobaldari.com

Country Italy

Software used ZBrush, Photoshop

Expertise Digital sculpting, creature, character and environment modelling

Unique ZBrush techniques

Sound of silence 2013

"Follow this step-by-step guide to create an image using Marcello's innovative polysketch style"

Marcello Baldari works in Turin for an animation studio, and previously worked in Milan on several TV spots and commercials. Marcello also teaches ZBrush anatomy

In this tutorial I'm going to show you how to create an image of a Viking warrior using my polysketch style, as well as other unique sculpting methods.

I'll start working with a mannequin to build the base pose, then create a model using DynaMesh, before rendering in ZBrush and compositing in Photoshop. During these steps, you will learn different uses of tools such as the Clip Plane tool and many tricks with various brushes and Alphas. To get the most from this tutorial you will need to be familiar with basic ZBrush functions.

Concept and sculpting

Pose the character, create an environment and sculpt the lower body

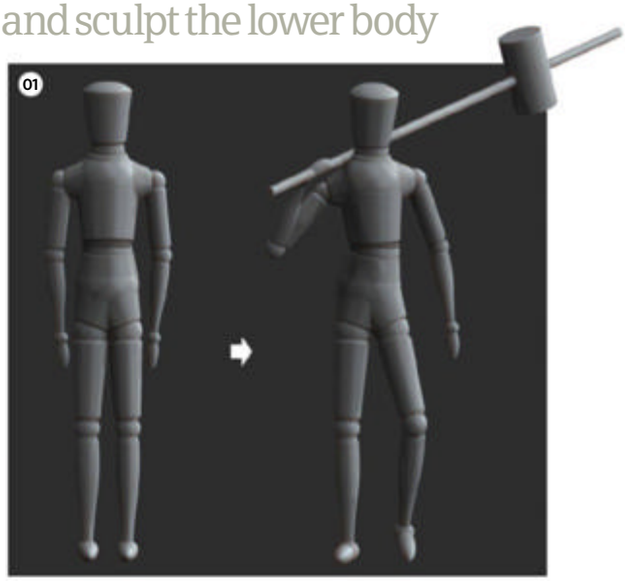
01 Pose the ZBrush mannequin Open ZBrush, go to Lightbox>Mannequin and select Mannequin.ZPR. Refer to the accompanying imagery to pose your character, using the Move, Rotate and Scale tools. Keep in mind that we want to communicate the right weight and scale for our mannequin. At this stage you can also create the first volumes for the weapon. Here I used two scaled cylinders to create the shaft and end of the blade. We don't need to define final forms at this stage; we just need basic shapes to inform us of the final shape and structure.

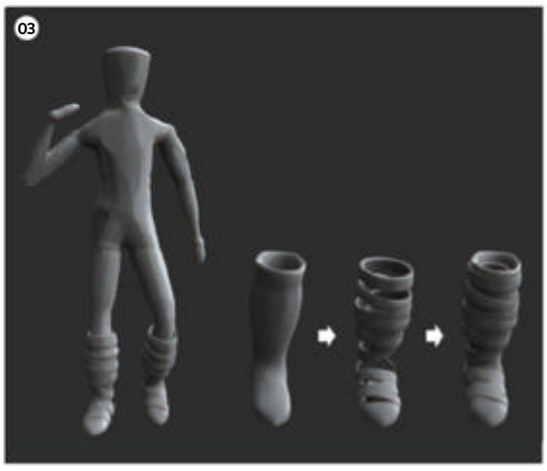
02 Sketch the environment After posing the character, I render and start working on the environment. Later the environment will be sculpted in ZBrush, but in this phase I work faster in Photoshop. Separate the image into three layers: foreground, middle ground and background and place the character between the foreground and middle ground. Again, definitive form is not vital here. Simply sketch out the shapes and space into the document.

Work quickly

It is important to bear in mind during these early stages that everything you are working on is simply a base concept. The model will likely change as you add detail later on, so don't spend too much time thinking over the finer points.

03 Sculpt the lower body We can now focus on the character. Convert the mannequin in DynaMesh (resolution 256) and with the Move and Clay brush adjust the body's general volumes. We must take into account that the character will be partially dressed, and as sketch the basic anatomical shapes without worrying about details. You can now start working on the character's boots. Mask the legs and use the Extract command (SubTool>Extract) with a value of 0.02 Thickness. With the same technique but using 0.008 values, create laces wrapped around the boots. Follow this process for the second leg. Next, create trousers, masking the affected area again and using the Extract command with 0.03 values.





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With the Disc

Tutorial files:
- Tutorial screenshots

Learn how to

- Use mannequins to pose your model
- Sculpt models in ZBrush
- Quickly model elements like armour and clothes with DynaMesh and Extract
- Alternative use of Clip Plane Tool and SnakeHook brush
- Use materials in ZBrush
- Understand the polysketching techniques
- Create a dynamic image
- Use Polypaint in ZBrush
- Utilise Posterised effects in the render stage
- Composite in Photoshop

Concept

When coming up with a concept for an image I think hard about what feeling I want it to convey. I search for interesting colours and try to think up interesting elements to include. I always want the final image to be dynamic and unique.

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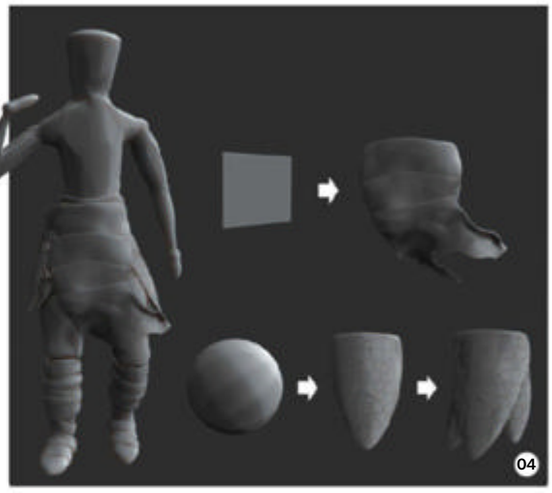
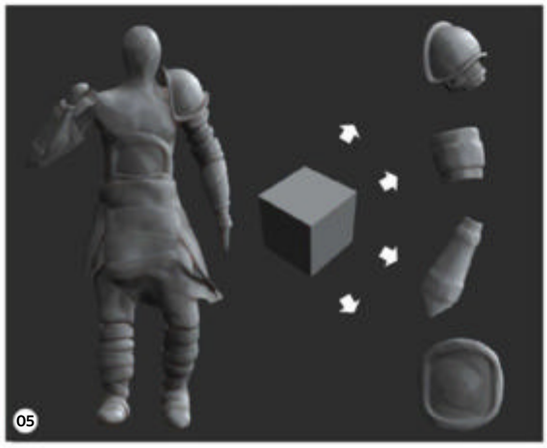
Define character

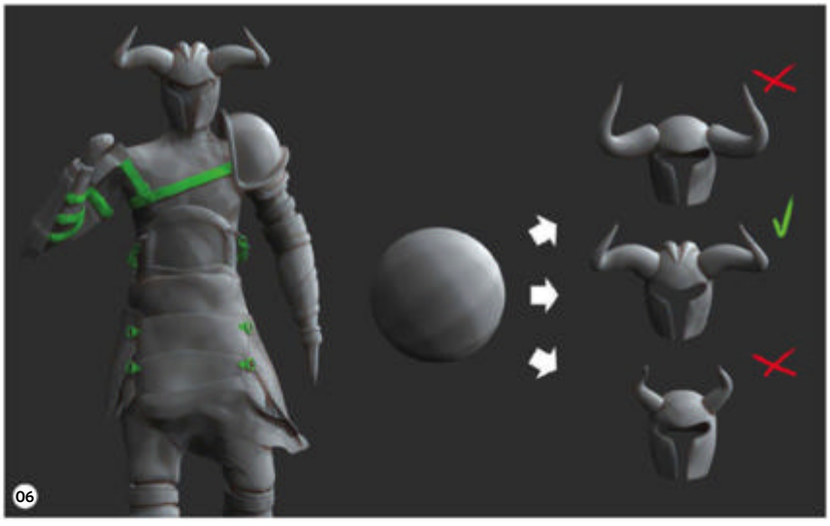
Start to focus on sculpting detail



04 Sculpt materials Add another layer of clothes in the form of trousers and then a strip tied around the waist. Mask the strip and apply it again using Extract>SubTool with a higher value than the one used for the trousers and adjust it with the Move brush. Next, add a plain SubTool (SubTool>Append) to create more scraps of fabric. With the Move brush, create the front fabric's first level and duplicate it several times to create various layers of stacked fabric. It's important to continue to use the Move brush to give the fabric a greater sense of dynamism: the image will be subject to weather such as the wind, something we need to keep in mind when we sculpt to avoid a static effect. To create the armour of the trousers, add a sphere to SubTool and start sculpting. In this case, when I obtained the desired shape, I duplicated it three times and created slightly different forms for each with the Move brush. I used the SubTool Master plug-in and activated the mirror command with the merge into one SubTool.



05 Sculpt the armour Now let's sculpt the armour on the arms. For this, apply the same technique as that used for the legs. Mask the area and use the Extract>SubTool command to create the first layer and then one more time to make the laces. For the shoulder armour, add a sphere to SubTool and sculpt it as desired. For the right arm's armour, add two cubes to SubTool and sculpt them. We can create the straps to hold the armour in place simply by masking the torso and making an extract. Next, add another cube to SubTool and sculpt it in order to create the armour for the abdomen. When sculpting armour, I often use a hard Polish brush to create hard edges and polish using the Features tool to make surfaces smooth while still maintaining their edges (Deformation>Polish).

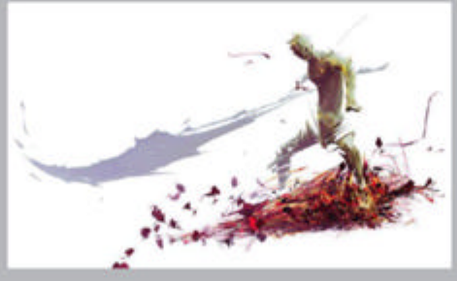


06 Sculpt the helmet and details Add another sphere to SubTools and then sculpt it to obtain the desired helmet shape. Here I used the Inflat, Standard and Polish brushes. To create the horns, use the Curve Tube brush with Symmetry activated. Add two cylinders with the CurveMode command (Stroke>Curves>CurveMode) to edit. Activate Lock Start (Curves>Lock Start), Size (Curves>Curve Modifier>Size) and invert the curve by clicking on FH (flip horizontal). Make several horns using this method and choose a pair that you think best suits your warrior's style. You can then use the InsertBrush tool to add a variety of chains and hooks to your character.

Artist showcase

Marcello Baldari

Marcello Baldari is a self-taught Italian artist who currently lives in Turin. Over the last two years he has worked on several film productions, while prior to that his experience lay in advertising. He currently teaches anatomy in ZBrush at iMasterArt in Turin, and he is partnering with some friends on the development of an upcoming videogame.



Polysketch - Ink Warrior **ZBrush, Photoshop (2012)**
The real challenge about realising the Ink Warrior was to try to achieve a concept art style look, rather than a traditional 3D illustrated look. I wanted everything to look like a fresh sketch, with dirty dynamic lines

Piranha **ZBrush, Photoshop (2012)**
When creating this model I was inspired by DreamWorks' range of colourful characters

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07 Sculpt the cloak Add a sphere to SubTool and DynaMesh mode (resolution 256) and sculpt the cloak using ClayTubes and Hard Polish brushes. Again, take into account the weather. Use the Move brush to flatten and push the cloak and clothes in the right direction. To create the band of cloth around the character's neck, mask the model and use the Extract command, then sculpt the material using ClayTubes and Hard Polish brushes. At this stage you can add a shield to the character's back using the Append command.

The polysketch technique

Even though I am a 3D artist, I love concept art and it is constantly influencing my work. I've been following artists such as Daniel Dociu and Richard Anderson for a long time, and last year I spent a few months studying their techniques to develop one of my own. I discovered a technique that I named polysketch because while I was working on in it felt like drawing polygons.

09 Polysketch intro Now that we have created our model we can start experimenting with the polysketch technique. The image should look like a sketch, so from here we will use a combination of the Clip Plane tool and SnakeHook brush. First, we must merge our SubTool in some working groups. For example: a group of legs, arms and chest in order to reduce the SubTools and keep your workflow more linear. At this stage is essential to choose the final view of your character and save it in Documents> ZApplink Properties>Front> Save Views. In the following stages it will be difficult to reproduce the exact effect I have created here. However, a lot of this will be down to your own experimentation and artistic sensibilities.

08 The weapon silhouette Now pinpoint the weapon's silhouette. We started out with a very basic shape, but now we can begin to define the lines and dynamic sense of shape to the sword. When studying a model's silhouette, my advice is to apply a material like Flat Color (Material>Flat Color) and colour it black. Convert the hammer in DynaMesh (128 resolution) and alter the weapon's silhouette with brushes like SnakeHook and Move, or tools like Clip Plane. It's important to keep in mind the strength of lines, the balance and the dynamic layout of the image.

10 Tool settings For the Clip Plane tool press and hold Cmd/Ctrl+Shift, move onto Brush and select Clip Curve, then go on stroke (while holding down Cmd/Ctrl+Shift) and select Lasso. For the SnakeHook brush, use Color Spray for the stroke and try Alpha 25. We can now start polysketching.

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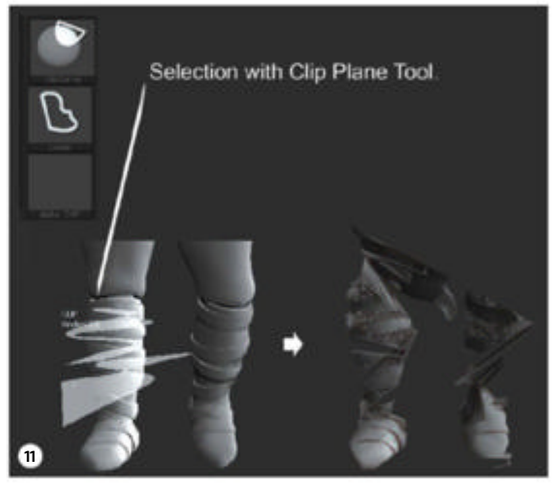
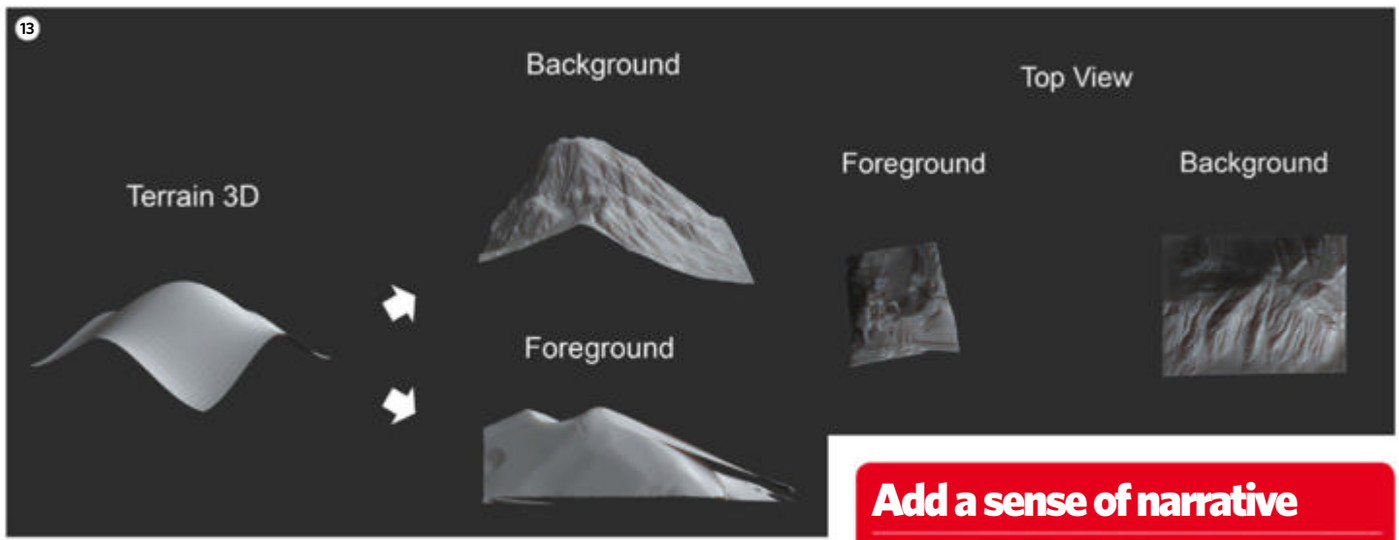
Polysketching

Tips and tricks to master the technique



11 Clip Plane tool We will start with the SubTool for the legs. To ensure a clear workflow we'll work on one leg at a time, masking the part that we want affected. Imagine using the Clip Plane as if it were a rubber then press (Cmd/Ctrl+Shift) and make selections on the affected area. Don't be afraid of making mistakes; in fact before you achieve the desired effect you will likely need to do some trial and error. Remember that you're attempting to simulate concept art rather than classic 3D, so you needn't worry about topology. Remember to work only from the previously created Front view, as the finished image will only look functional from this view.

12 SnakeHook Brush Now we can use the SnakeHook brush as if it were a Photoshop brush to create a number of dynamic effects. We can also change the alpha settings to get a series of different and varied results. Experimentation at this stage is much advised.



13 Create the environment Now we have completed the character profile, it is time to build out the environment that we previously sketched in Photoshop. This character is in a mountainous landscape so we will sculpt two mountains; one in the foreground and another in the background. To sculpt these use the Append command to add a Terrain 3D to your SubTool. Sculpt the first mountain using ClayTubes, Inflat and Polish brushes and move it behind the character. Duplicate the mountain and move it to create another in the foreground. Move it under the character and make sure that the surroundings match the look of the character.

Add a sense of narrative

We really want our final image to feel exciting, so it's a good idea to add in scenic elements that hint at the end of a battle, such as banners with flags. Add some Cylinders to SubTool, convert them in DynaMesh and start to sculpt swords, spears, flags and other abstract elements with the Clip Plane tool and the SnakeHook brush. Position these elements in a layout that frames the main character, taking into account their distance from the camera.

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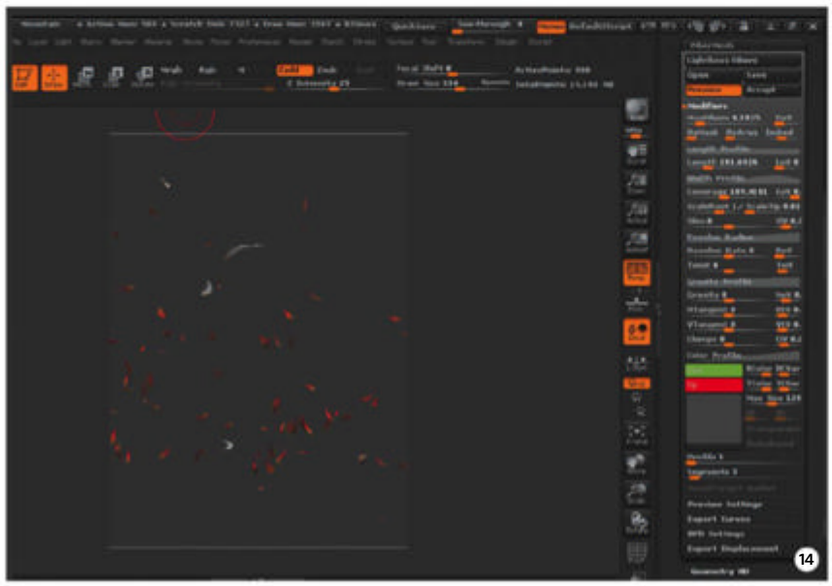
Finalise the image

Use FiberMesh and compose the image in Photoshop

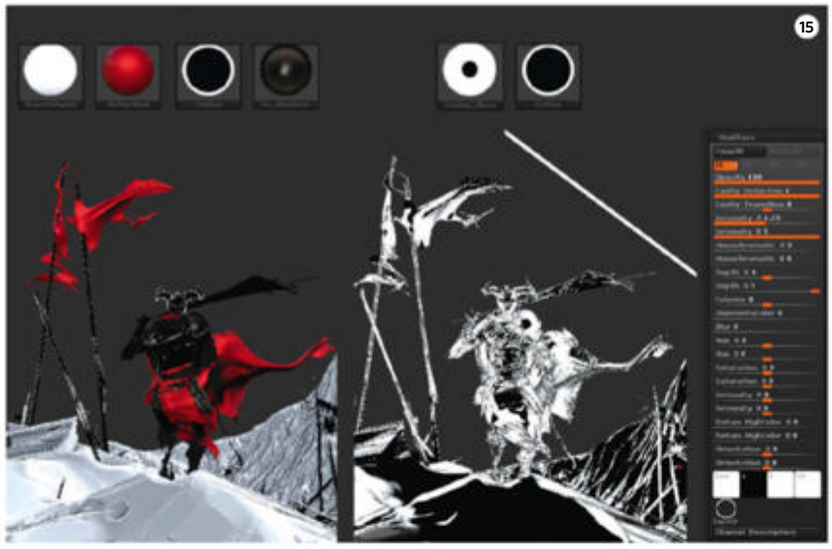


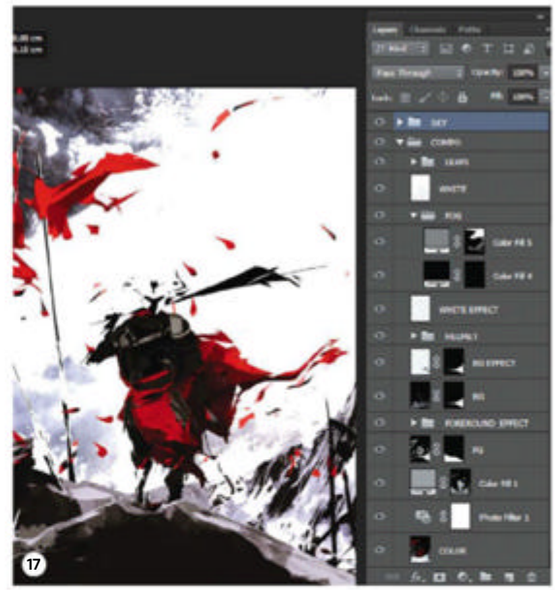
14 Use FiberMesh to create leaves I often create effects such as leaves that flutter across the landscape. To do this, I use the FiberMesh tool in ZBrush. Edit the Fiber to give it a shape similar to that of leaves and click Accept. Now select the SubTool leaves and sculpt the mesh using the Clip Plane tool or Move and SnakeHook brushes.

15 Polypaint Using four strong colours – black, white, grey and red – makes for a strong image. Here I used the reflected red material for cloak and flags. For most of the clothes, helmet and scenic elements I used the outline material that I subsequently reused (reversing the black with white) to colour the mountains. For the armour I chose metallic material. Apply these materials to the various SubTools.

Image planes in ZBrush

When I have to re-create an environment and match it with the concept, I often use ZBrush's image planes. I introduce the model in the scene and I activate the Floor setting. I then go to the Draw menu and I click on Open to choose my references and upload them on my different views (front, back, side, top etc). Here we have the ability to translate, scale, and repeat the image. In doing so I can match my model with the concept. Once placed on the floor, I click save and I start to sculpt my environment according to my references.





16 Start rendering Before compositing everything in Photoshop we need to complete several render passes. For an image of this nature it is best not to use traditional lighting (key, fill and rim). You only need a key by which you will obtain a colour pass and a second pass in black & white. Also use the Fiber, Shadow, AO, Fog and Depth cue pass. Render with Best Preview Render and set the Posterized option to 46. See the attached image for settings.

17 Compositing Now we have everything ready, we are ready to composite the image in Photoshop. Start by adding some filters to the colour pass. Next, using the black & white pass and some masks, specifically rendered, work on the contrast between the white, black and red colours, and also on the depth. Next, add some white brush strokes throughout the image, making it look more dynamic and less like a static model. Finally, add some clouds and the FiberMesh pass to simulate the effect of the leaves.

• DID YOU KNOW? • All tutorial files can also be downloaded from: **www.3dartistonline.com/files**

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3DArtistonline
Username: tian
Website
www.tiancocker.com
Country UK
Software used
ZBrush, Maya

"Reference materials, no matter how good, can never substitute a solid grasp of anatomy. Spend as much time as you can studying anatomy; learn how internal structures such as the muscles and skeleton operate together to determine external form"

Diana Vishneva 2013

The ballerina is a figure study exploring anatomy and form. I was inspired by ballerinas' athletic perfection and their balance of physical strength and delicate beauty. This is a break away from the stereotypical portrayal of women in 3D art and demonstrates a realistic feminine power. I wanted to do justice to their continuous training, pushing themselves to new limits as I refine my own 3D skills.

"I use Maya to pose my figures. It's a very stable process that provides a lot of control when posing multiple subtools. Having the ability to copy skin weights from the body to the clothing, or use wrap deformers, is a great bonus"

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Masterclass

Gustavo Åhlén is founder/creative director at Enginetion. His Masterclass will teach you to sculpt the skeletal legs and feet in ZBrush

With the Disc

Tutorial files:
- Main image.jpg
- Supporting image 1.jpg
- Supporting image 2.jpg
- Boxout1.jpg
- Boxout2.jpg

Gustavo's final work helps to better understand how to sculpt the human legs and feet

Sculpt the legs and feet

"Use ZBrush to create the lower half of the human body in this detailed anatomy tutorial"

In this final section of my ZBrush anatomy masterclass I will reveal the workflow steps for creating a digital sculpture of the skeletal legs and feet.

First, a medical introduction to the legs and bones of the lower half of the body, as understanding the structure and anatomy of the bones is integral to the process of re-creating them in ZBrush.

The legs are made up of the femur, or the thighbone, which is the area between the pelvis and the knee. The patella is the knee cap, the tibia is the larger of the two bones below the knee cap, and the fibula is the smaller of the two leg bones located below the knee cap. The feet are constructed in separate sectors by the following bones: the tarsus (talus, calcaneus, cuneiformes, cuboid and navicular), metatarsus (first, second, third, fourth and fifth metatarsal bone) and phalanges.

When we start to sculpt, we need to pay attention to the femur head (upper extremity) and the lower extremity as well as the extremities of the tibia and fibula. The femur head is the joint with the hip and the lower extremity is the joint with the tibia. Understanding these joints is really important because you need to know the correct rotations and how they connect the joints. Reference and medical information can be found via the internet, where you can get a better idea about each joint and how these bones work. By using the brushes Move or Move topological you can approximate the joints between each bone that we have separated in SubTools.

Throughout this masterclass you will find boxouts where I have included detailed explanations about the processes used in each step. I also recommend that anyone reading this tutorial also pick up some books on human anatomy to gain a better understanding of how the skeleton works.

Finally, you can improve your final model by adding more details and activating alphas in the brushes to add irregular surfaces. I recommend the use of hPolish brush, because sometimes we get rounded models and a good way to flatten these areas is the use of this brush. The most important steps are detailed in this masterclass, but you can improve the final model according to your personal tastes.

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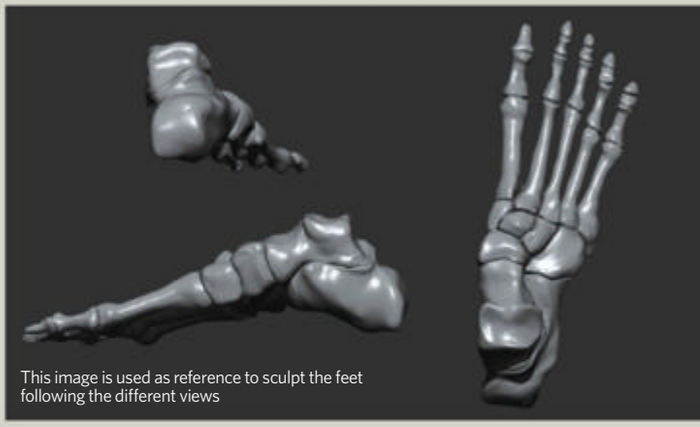
This image can be used to position the feet and legs using the scales as reference



This image is used as reference to sculpt the feet following the different views

How proportions, scales and angles shape our model

When we start a new sculpture in 3D, we should pay attention to the proportions, scales and angles because it lets us gain better control over the individual shapes. When we talk about proportions, we must take into account the length and width as well as the thickness. Sometimes it may be the case that we make a model with the proper length but with the wrong thickness. When we are sculpting a small part of a model and not the complete piece, we can sometimes lose the proportions as linked to other parts. A good way to get around this is to sculpt the smaller parts while using the larger model as a reference.

Start simple

01 Start with ZSphere

The first step is to attach our first tool as ZSphere. Go to Tool>ZSphere. After selecting ZSphere we need to do a left-click over the background (work interface) while you drag and drop over it. Convert the ZSphere into an editable object by activating Edit (shortcut T). Go to Texture> Image plane and finally Load Image to open the reference image of the feet included with the cover disc. This will aid you when sculpting anatomically correct shapes.

02 Start sculpting the feet

It is time to start defining the shape of the toes. For this, we need to change the brush size using small values and try to draw a new small sphere over the main ZSphere. When this new sphere starts to appear, go to Move (shortcut, W) and try to move it to where you would find the joints. Now, over this new joint, draw a new sphere, and do the same step for each toe. Remember that each toe originates from the main ZSphere created in Step 1 and the brush size will define the width of each section of the toe.

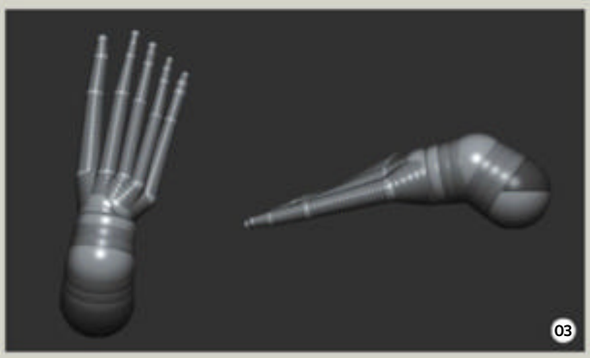
03 Use side views as reference

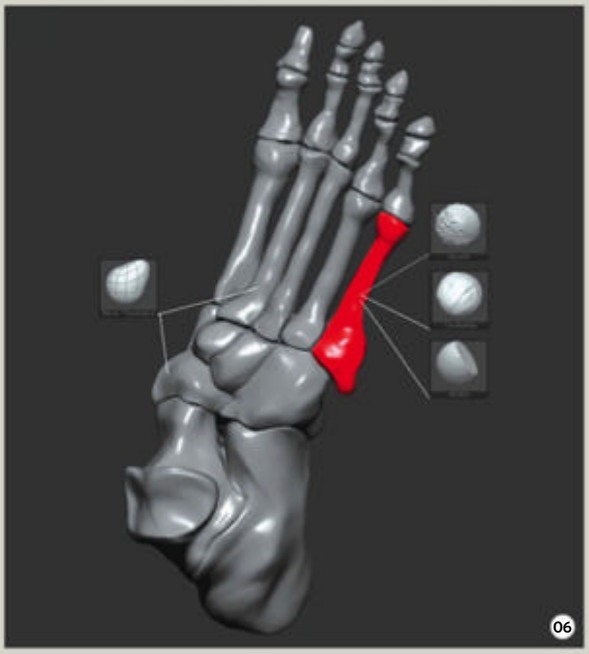
In the previous step I have used a frontal view as reference, but now we need to move these joints using the side views to ensure we are sculpting the correct proportions. This process will change the length between the joints. Try to get a similar model as in the image used for reference. You need to change from Draw to Move using small values of draw size, because if you have high values of draw size you will modify other joints. Keep this in mind when you need to Move closed joints.

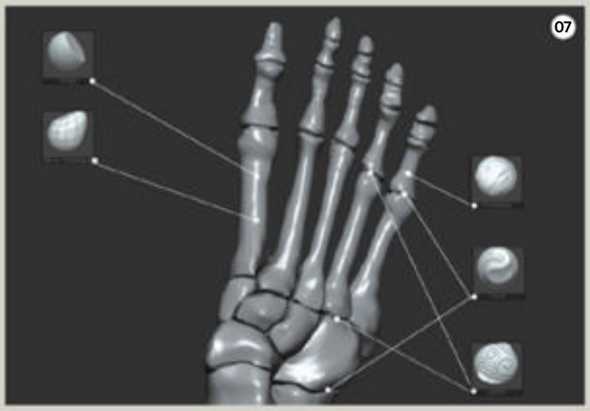
01 ZSphere is used to start the model of the skeleton

02 The skeleton for the feet is the first step before converting it

03 Using frontal and side views help us to control the length between the joints







04 Convert the model to adaptive skin to start sculpting details

05 The Deformation options are really useful to create changes in the unmasked areas

06 Different brushes and values of intensity allow us to get a better control over the entire mesh

07 Using different brushes is key to achieving a great final result

08 Use ZSphere to create separated SubTools for each leg bone

04 Convert to adaptive skin

After creating the base sculpt of our skeletal feet we can view a preview of the model by converting our skeleton using Adaptive Skin (shortcut, A or go to Tool>Adaptive skin). It is really important to change the values of Density because this will increase or decrease the subdivision level (SDiv). In this case I have used Density=5. Now we'll mask all by holding Cmd/Ctrl and clicking in an empty space. You then need to unmask the areas of the joints, holding Cmd/Ctrl+Opt/Alt and unmasking these areas as you can see in the screenshot.

05 Define basic shapes

Now we need to inflate the unmasked areas to start sculpting the joints, which are very often bulkier. For this go to Tool> Deformation and increase the levels of the Inflate feature. This is a good option to increase the clay in the unmasked areas. Afterwards, we need to unmask all, by holding Cmd/Ctrl and clicking on the background while you drag and drop.

06 Sculpt the feet

It is time to sculpt the feet. Using the reference images, use the brush Move Topological to get an approximate clay to the reference before sculpting it. Using Move Topological enables us to move the mesh separated from the rest of the polygons by areas according to the draw size. It is important to test it to understand the differences between the brushes Move and Move topological changing the draw size. Then, we must use the brush ClayBuildup with a low intensity, such as 20, to gain better control over the clay. Now finally we need to smooth it.

07 Add small details

Here we use several brushes; ClayBuildup: used to get an approximate shape, Smooth: used to smooth the mesh, Slash3: used to create separations between the bones (joints), Pinch: used to reduce the space between these separations, hPolish: Used to flatten the curves or irregular meshes. When using hPolish, try to test this brush while you hold Opt/Alt to flatten the mesh under or over the current mesh. Opt/Alt reverse the current option selected (Zadd or Zsub). After the sculpting you can convert the feet into Polymesh3D. Apply DynaMesh to add more details and correct imperfections (closing holes). Save the feet by selecting Tool>Save As.

08 Create a ZSphere for the legs

Now, create a new empty document. We need to create different SubTools for the bones of the legs: the femur, patella, tibia and fibula. To create the femur, go to Tool and select ZSphere and load the reference image. Draw the ZSphere over the image. Change the size of the ZSphere positioning it over the reference images and follow the steps previously used. Next create the tibia and fibula bones. Go to SubTool>Insert and load a new ZSphere, following the same process as for the femur. To create the patella bone, insert a Sphere.

Using the options of deformation

The options of Deformation (Tool>Deformation) are really useful to quickly convert meshes, because in some cases we have big scales. A good tip to decrease the scale of the model is using Size into Deformation keeping the 3 axis (x,y,z) to decrease or increase the scale of the shape proportionally. If we import a tool with a big scale and we use the common Scale (Key=E) to reduce it, sometimes we need to rescale a lot of times, reducing the piece very slowly in the process. That is why I highly recommend the use of Size into Deformation to resize the piece quickly.

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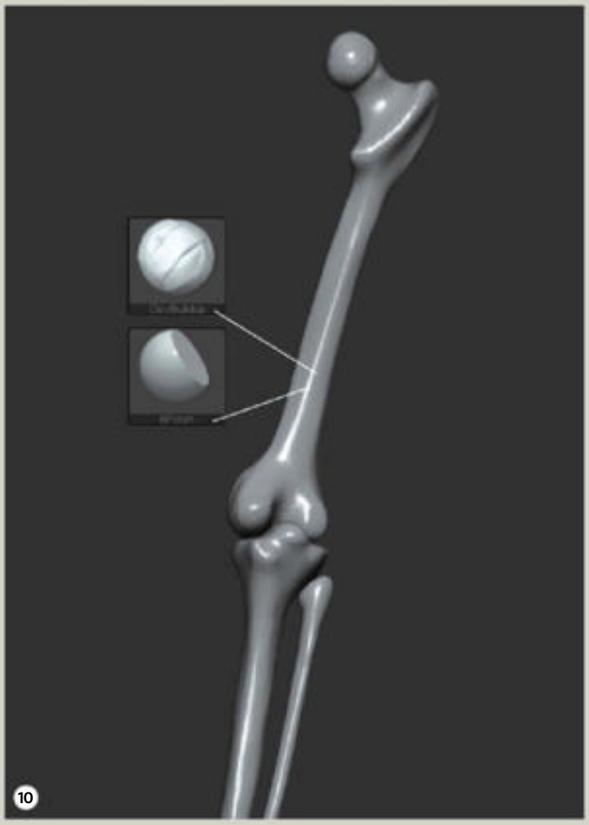
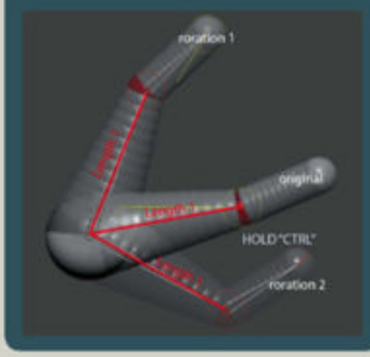


Bone expansion and contraction

After you have converted the skeleton with ZSphere in Polymesh3D, you can stretch or contract the bones of the feet and legs. A good tip to modify these rotations while maintaining the original length is using Move while you are holding Ctrl as you can see in the image below. There is also another very interesting option available when holding Opt/Alt. If you are working with ZSphere and you drag over the background while you are holding Opt/Alt you will move the complete model. Check out how Length 1 stays the same length while we rotate the bones.



09 Convert ZSphere in Adaptive skin

Convert each SubTool in adaptive skin (shortcut, A) and go to Tool>Adaptive Skin. Increase the density to get a better quality in each SubTool before you start sculpting on clay. You will get something similar to the accompanying current image without a defined mesh and overlap, but don't worry about it, because we have separated the bones in SubTools. In this case I have used Adaptive skin 'Density=5'.

10 Sculpt the legs

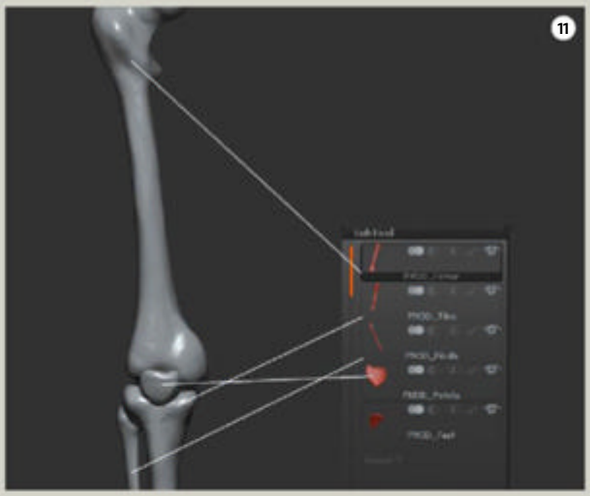
Now we can start to sculpt the mesh. In this case I have used ClayBuildup and I have activated BackfaceMask from Brush>Auto Masking>BackfaceMask). I recommend holding Opt/Alt while you are sculpting to subtract the clay (ZSub) using low values of intensity. hPolish can help you to get a flatter mesh for a more defined model. After this we can use Smooth brush by holding Shift and smooth the mesh using low values of intensity. Carry out this process for each SubTool.

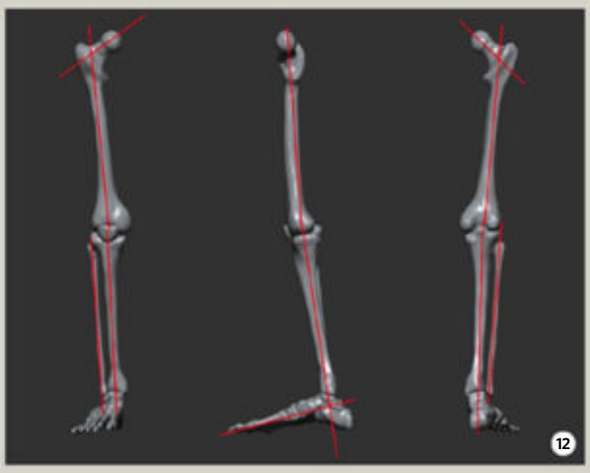
11 Convert SubTools in Polymesh

Convert each SubTool in Polymesh3D. Rename each SubTool as femur, patella, tibia and fibula. Hit Make Polymesh3D over a SubTool to create a new mesh called PM3D_femur according to the SubTool name. Automatically, this will change to the new mesh created as PM3D_femur. You then need to go back to the original tool where the three SubTools are located and convert them as Polymesh. Once you've created the three SubTools as Polymesh3D, you can open the document previously saved for the feet and insert each SubTool (femur, patella, tibia and fibula) like you've previously done.

12 Positions, scales and angles

Once we have opened the feet document and we have merged it with the SubTools of legs, we need to rotate the feet and legs bones to ensure that they have a good fit between them. Take into account the positions, scales and angles used in the reference images. You can export the project to OBJ, open it into any 3D software and activate the symmetry to create the other leg. It is then time to render.





09 Adaptive skin enables us to get an approximate mesh to the final model from ZSphere tool

10 It is important to clean the curved areas using the hPolish brush

11 Converting the SubTools in Polymesh3D allows us to gain a better control over the meshes

12 Carefully consider position, scale and angle when adding the feet

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This article provides a general overview of the process involved in creating a fictional vehicle

With the Disc

Tutorial files:
• LightWave model, SCENE file and tutorial screenshots

Here the sports car is rendered against a banked racing circuit backplate

LightWave, KeyShot

Create a sports vehicle

"A workflow overview of the design, modelling, and rendering process"

The first important fact to recognise when approaching the task of designing a vehicle (or anything else for that matter) is that, within reason, there is no wrong or right way of doing it. Every artist will have their own methods and processes. For me personally the design stage is always the biggest challenge by a mile. The reasons for this are twofold. For starters, I am not inherently all that creative. I've worked with concept artists in the past who can spew forth amazing ideas on demand. Even more annoyingly they can put those ideas in to off-the-cuff sketches which I would class as works of art.

I can't draw either and for this reason I picked up my starting workflow from two concept artists I worked with. This involved creating a model rough. The purpose of the rough is not to look good, it simply gives you a feel for the shape and weight of your design. Once the rough feels right, it forms an initial template over which you can begin work on the final high detailed model.

Now I personally find that no matter how hard I try, and this could be a result of not being massively creative, I will always expand upon and deviate from my rough model. This is fine, but consideration needs to be given to the workflow as a whole. As in the case of this tutorial overview, my deviation all occurs early on, which is just as well, because although the model is created and modelled in LightWave, the rendering will be tackled in KeyShot Pro and this creates an effective dead-end between the two pieces of software. Once the model has left LightWave and is in KeyShot, there is no going back to make changes, as this effectively scraps any work in KeyShot. See the boxout for more on this.

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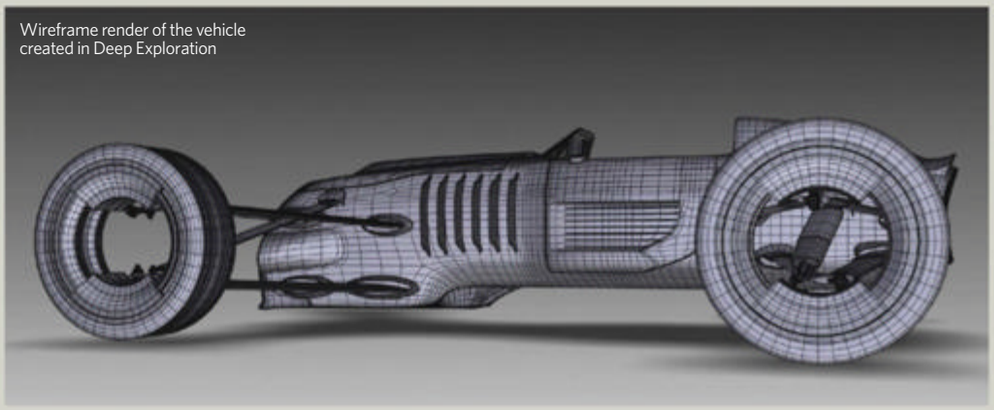
Render in a neutral environment so you can focus on just the car

Expect the unexpected

One of every artist's worst nightmares is software crashing. It cannot be emphasised enough that you should save often when working, but nonetheless, we all get caught out. Whatever software you are using, you'll begin to see a pattern to crashes, and you'll know certain operations that are riskier than others. At the very least you should save your current position before going further. Constant saving can eat up disk space (you'll be saving incremental copies, not saving over the same file!), but once a project is completed, you can house keep and clear off old saves.

So why render in KeyShot and not LightWave? One reason is that it is a workflow to highlight for the purpose of this article, but also because it renders much faster than LightWave when using HDRI lighting for the scenes. That's not to say it is always the automatic choice, often enough LightWave will produce the keeper. It's swings and roundabouts!



Wireframe render of the vehicle created in Deep Exploration

Design, model and render

01 Choose a design

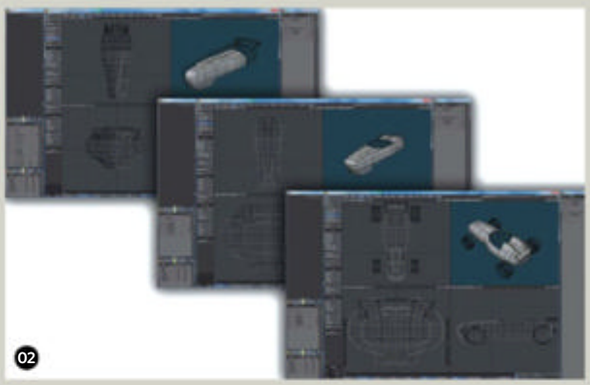
When starting out, I had one specific direction in mind; an open wheeled single seater. My reason for this choice was very simple. I'm less adept at designing most times I try, and this reduces to some degree the burden of designing a car, because there is less of it to design in terms of body shell area. The reality is that it does make other elements visible that you then have to tackle, so the end result isn't always an easier task! In the end I stuck to my original idea, but added an extra seat.

02 Begin modelling

The model rough forms the template for developing the final shape and form of the model. This doesn't mean you are bound by its shape and proportions though. As you'll see very clearly from the tutorial, I deviate from my initial design as I go on. Of course, if you've been commissioned to model someone else's design, you'll be less likely to do this!

03 Begin deviating

The rough model serves as a basic shape and proportion exercise, which doesn't really focus greatly on any kind of specifics. Looking at the rough, I decided I wanted a more dynamic stance, even if in reality it would be a design that would break pretty much right away. So the front wheels were thrown forward like a car equivalent of swept-forward plane wings.



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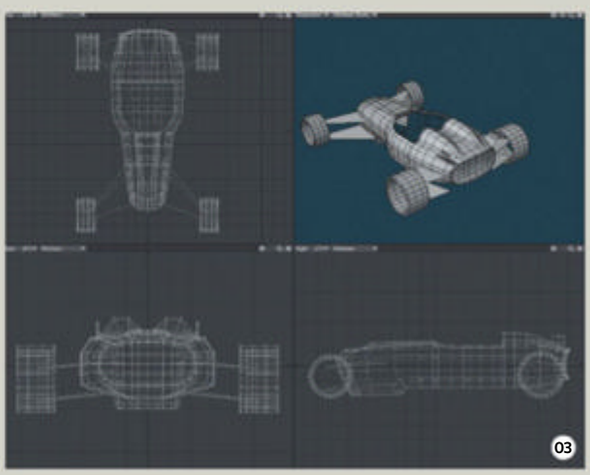

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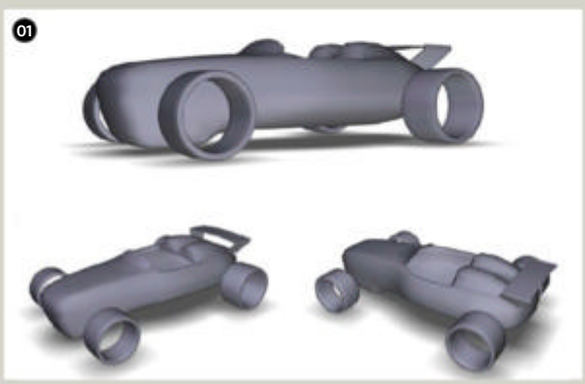

01

01 Roughed out initial design

02 Progressive build up over the rough model

03 Change of plan!

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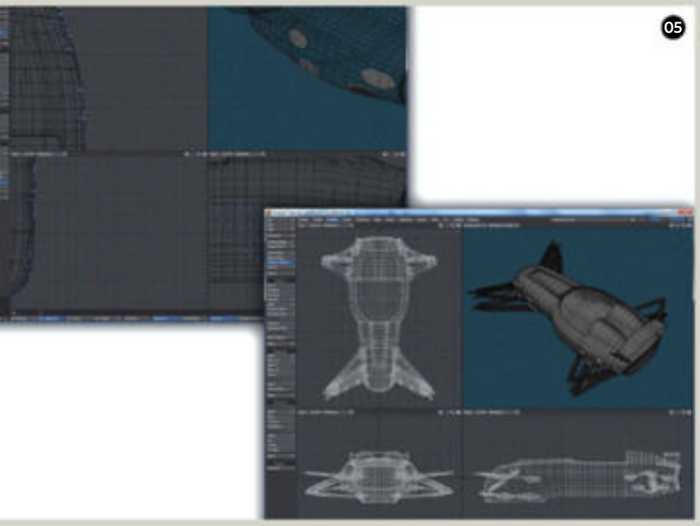
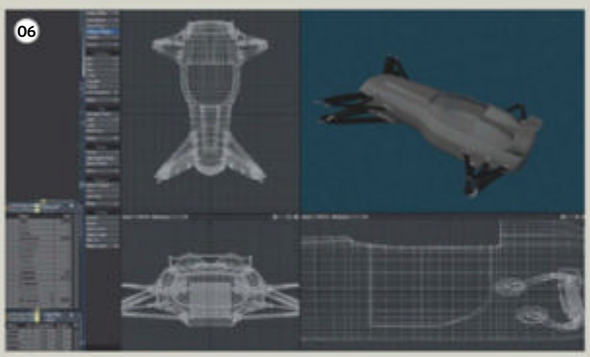
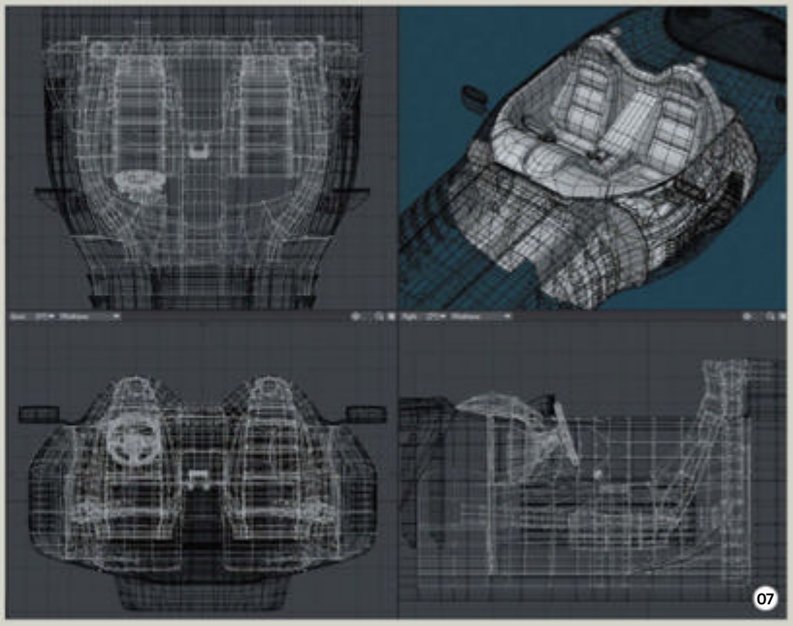
3DArtist Back to basics







04 Building up the suspension rig

05 The suspension mounting points

06 Adding the essential details

07 Medium distance friendly interior

08 Specifying the surface names

04 Add in suspension and other details

The suspension wishbones are simple extruded box sections, and their form is taken straight from Formula 1 in design and appearance. They'll eventually be shaded as carbon fibre, but for now their basic design and shape is created and loosely tied to the car chassis' shape and position.

05 Hang it all together

I decided that where the suspension components enter the body shell, I would create cowls to make the car aerodynamic. In LightWave there's a nice tool called Heat Shrink that has been recently added. In this example, I modelled discs to the foot print size of the cowls, and with heat shrink you can stick them to the surface of the background layer geometry. Very handy!

06 Insert doors

With the major modelling done in terms of the car shape and main component layouts, you can spend time on the essentials. For a car, one critical essential is doors. Having already frozen the model at Subdivision level 2 (this makes the model easier to work with in terms of holding its shape when adding extra detail, but low density enough to use as a SubD model) my preferred method is the easiest one. I therefore use the flow of existing polygons to define the door shape. You can see in the image clearly where I have tripled key polygons to give me the angled trailing edge.

07 Interior work

Not being the most creative person can be a headache, and this time I ran out of creative steam with the interior. I managed to come up with one that looked cool in overall shape and style, but I have struggled to design any detail to it. Luckily I don't intend to get close to the vehicle with my renders, so in this instance it doesn't matter too much. I'll no doubt come back to it another time to finish the interior!

08 Set up your surfaces

This is probably the first part of the process where you have to give serious thought to the rendering phase. There are two facets to this. First you need to assign surfaces to all the polygons that you'll want to shade differently in KeyShot. In conjunction with this, organise your layers into objects you wish to separate in KeyShot. Each layer becomes a separate group in KeyShot, with separately editable shaders. In LightWave, any polygon in any layer called glass is edited as a group. In KeyShot they become independent. So glass originating in layer 1 in LightWave can be shaded differently than glass from layer 2.

Don't be afraid to ask for help

I make my living as a hard-surface modeller and as such I have no skills in character work. Ross Mansfield and Tim Gosling were kind enough to answer my call for a driver for this vehicle. As it happens, only his head is seen, so I could have done that much myself, but subsequent renders will be better for having accepted someone else's skills serve the final output better than mine. We'd all like to claim 100% credit for all the content, and we surely aim for that, but in the meantime, don't be afraid to use help from your peers.

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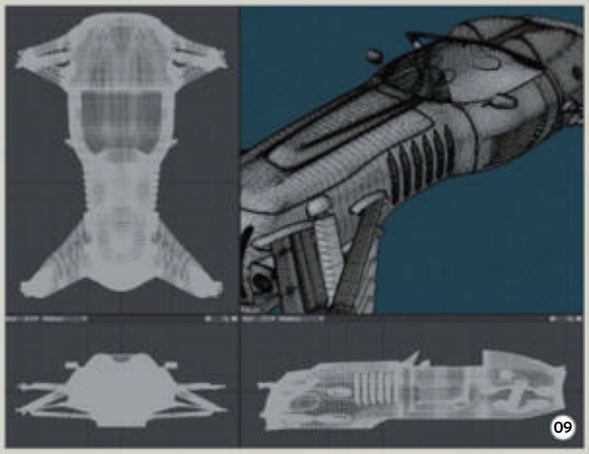

09 Export

Exporting the model into KeyShot is a simple step. If you have modelled in SubD's then the first step is to freeze the geometry to polygons. You might want to give some thought to how close you want to get to it in KeyShot. For general use level 4 subpatch is fine. For close-up rendering, aim for a minimum of level 6. For Catmul Clark use half the level of LightWave subpatches. To keep everything simple at the KeyShot end I always triple any non-planar polygons as well. I always use Deep Exploration to create my OBJ files, but LightWave can do that too.

10 Import and shade

Next up it's over to KeyShot to import the OBJ models. If you have more than one model, after the first is imported, by default KeyShot will import subsequent models with the same settings, so they all come in positioned correctly relative to one another. There is an option to snap models to the ground if they end up half buried in the floor. You can see the list of model entities in the screenshot corresponds to the surfaces created in LightWave. I've then dragged and dropped shaders from the materials library, and made any necessary tweaks as I go along.

11 Final rendering

For my base lighting and backplate, I've used an HDRI and backplate pairing produced by Harniman Photographer – www.harniman.com with permission. I then added a light pin in the environment editor to boost the sun light, and added a new light in KeyShot to give me some defined ground shadows. For rendering, I usually go for a time-based final render. I simply tell KeyShot how many hours it can have to complete the render, and then patiently leave it to it. For assured flexibility, I think it's always worthwhile rendering out to either 32bit TIFF with Alpha or EXR.

12 Grade your render

The quality of the rendered output from KeyShot is superb, that's for certain, but for a lot of stuff, the output is too crisp and precise. That's great for product visualisation stuff, but often it can be a huge benefit just to dial back the crispness and introduce some of the imperfections we see in the real world. I have a Photoshop action I created which gives me a one hit grade, adding chromatic aberration, some film noise, and a slight colour cast which brings down the saturation of the colours a touch. For this render I added a curves adjustment layer first to bump up the contrast a bit. Also, check out the Grading Your Renders post on my blog (www.scorpiocgi.co.uk) to download the Photoshop Action.

09 Begin exporting to OBJ format

10 Importing and shading work

11 The final rendered output

12 Finish post work in Photoshop

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The advisors

3ds Max, V-Ray

Lilit Hayrapetyan
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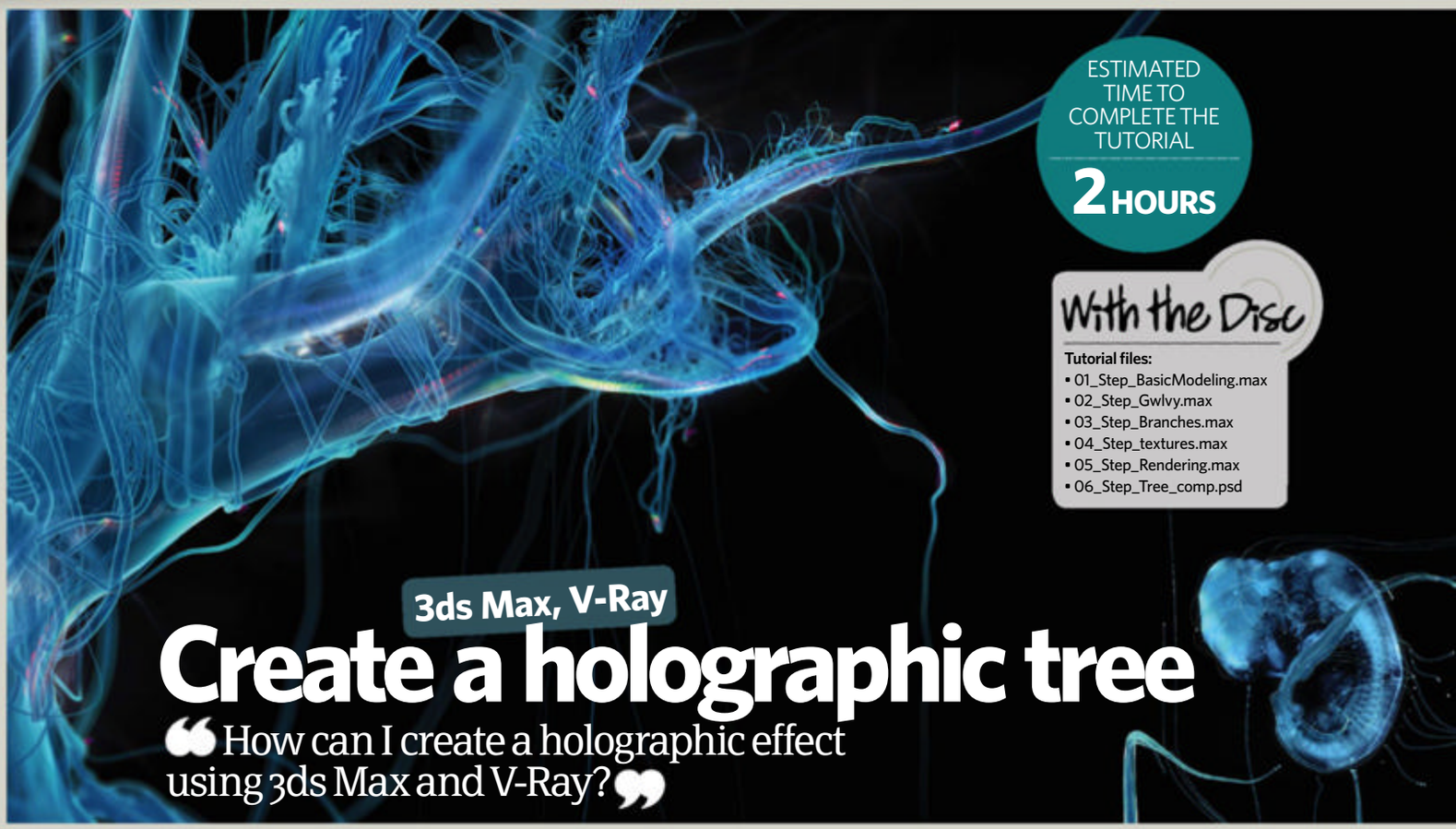
Lilit is an art director, designer and 3D artist based in the Los Angeles area, possessing more than ten years of working experience in the field of 3D design.

Photoshop

Elizabeth Gallagher
www.texturesrus.net

Elizabeth is a commercial texture artist and CEO of TRU Textures Ltd. Check out past issues of **3D Artist** for examples of her fantastic work on the cover disc!



ESTIMATED TIME TO COMPLETE THE TUTORIAL
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With the Disc

Tutorial files:
- 01_Step_BasicModeling.max
- 02_Step_Gwlvy.max
- 03_Step_Branches.max
- 04_Step_textures.max
- 05_Step_Rendering.max
- 06_Step_Tree_comp.psd

3ds Max, V-Ray

Create a holographic tree

"How can I create a holographic effect using 3ds Max and V-Ray?"

I created this holographic tree effect when pitching for the Spider-Man project at Prologue. About ten designers were on this project. I was very lucky to work with Danny Yount, Kyle Cooper and Ilya Abulhanov, who were some of the most inspiring artists I have ever worked with.

I had about ten days to present the pitch. Unfortunately, I didn't have much time to properly archive my work, so I recreated some parts for this tutorial.

In the first week I experimented with tree plug-ins that I have never used before which, combined with creating style frames at the same time, was very challenging. I liked the GrowFX plug-in from www.exlevel.com. You can find some variations of the tree on my website (www.lilithayrapetyan.com) using this plug-in. It's very complex, and has a lot of features. You can create realistic trees, as well as some unusual shapes that don't exist in real life.

However, for this particular tree I preferred to build manually, giving me more control over the final look. As such I used the Ivy Generator plug-in from GuruWare (www.guruware.at). This program allows you to simply and easily create branches.

I did a lot of research and found the scan shader/V-Ray simbiont material, which was close to what I was looking for to achieve the holographic effect. My references were underwater self-illuminated creatures like jellyfish; nature is a great place to find visual inspiration!

For those tackling this technique,a basic knowledge of 3ds Max modelling and V-Ray rendering is vital. We will start by modelling the basic shape of the tree.

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LightWave 3D
Ben Cooper
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Ben is studio producer at The Dreamvision Company/Character Matters. He heads up lighting and compositing, and specialises in LightWave 3D.

FumeFX, 3dsMax
Gustavo Åhlén
www.gustavoahlen.com

Gustavo is founder and creative director at Enginetion. He is also a professional 3D and visual effects designer in the film, videogame and advertising industries.

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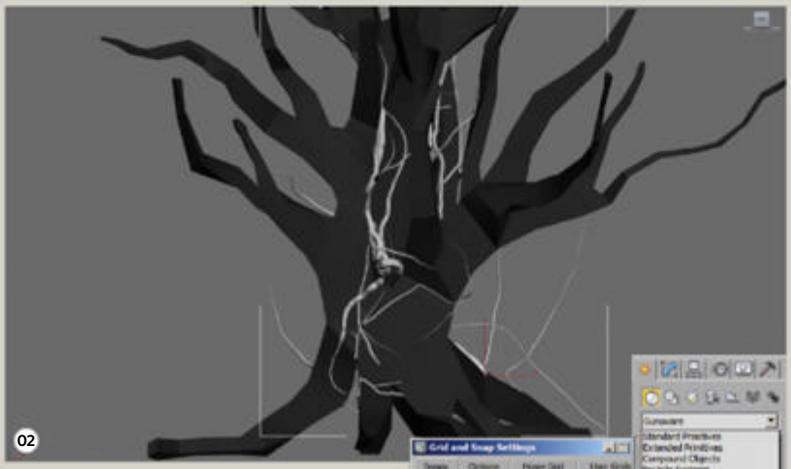


01 Model the tree

Starting with a simple box, we are going to extrude some branches, cutting some of the polygons and extruding them in a few steps. You can also use Extrude by Spline to create a spline, while extruding the spline's direction. Feel free to experiment with the design your branches. Personally, I prepare to extrude by manually scaling and rotating the end of the polygon using multiplier edit polys so that I can go back to certain steps if I need to.

02 Create branches

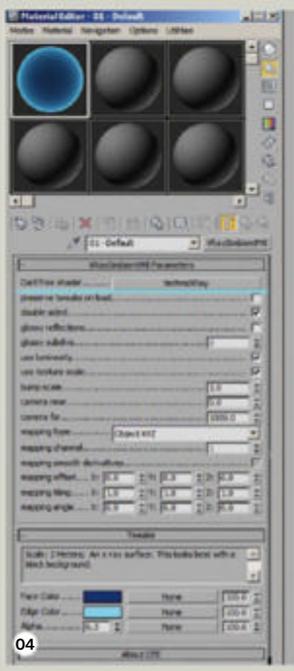
After successfully installing GuruWare, the software should appear in your Geometries section. The most important thing to do before starting to generate ivy is to ensure that your Snaps toggle is on and that you have checked on vertex\edge\segments or face so that the start point of Ivy will be created on the top of your tree. Click on gwIvy, select some parts of your tree trunk with the Snap toggle on, then click Grow ivy. It will automatically generate branches with leaves. On the View/render section, turn off L, which will hide the leaves.

03 Vary the branches

After ivy is generated, you can play with the age setting to make it shorter. However, the most important setting I experimented with was the scale Ivy parameters, which you will find in the Misc tab. Scaling up the ivy will overwrite all the settings above the smaller areas. For example, if you scale up from 1 to 10 (don't press the Scale Down button, this comes later) you will have ten-times smaller branches, which allows for organic variation. I also experimented with gravity and adhesion (attraction to mesh) while generating different branches. Some of them follow the main mesh of the tree, while some of them grow into their own direction. I used a Relax modifier on some of the branches so that they looked a lot smoother. After you're happy with the shapes, convert them to an editable poly. Select all and apply Mesh Smooth. I placed the camera to the side of the tree so that I was able to capture some close-ups of the various branches.

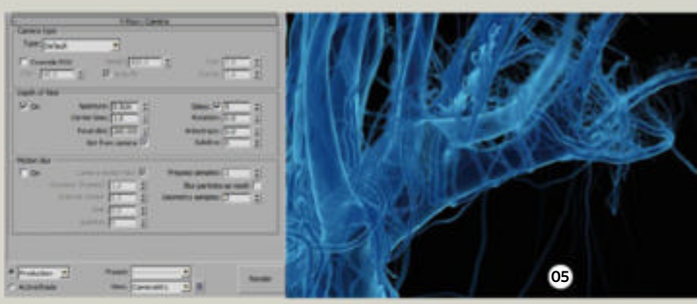
04 Begin texturing

Let's move to Material Editor; my favourite part of the process. Be sure that you have switched from standard rendering to V-Ray. Select from VRaySimbiontMtl, click on NONE and select from your downloaded textures collection from Darktrees tx_techno technoXray. This is a great Xray shader which recognises 3D lighting. Select everything and then apply the shader. I really liked the default colours, so left them as they were. Tip: if you open the supplied file '04_step_textures', be aware you have to re-path the technoXray inside the VRaysimbiont material.



05 Start rendering

Keep the default V-Ray rendering settings, but with Indirect Illumination turned off. Turn on Camera, Depth of Field and Get From Camera so that the focus point is drawing from the camera target. Now, hit Render, and await the results.



06 Composite in Photoshop

Do some colour correction in Photoshop and create a new layer with Overlay mode and painted different blue and greens, which make for a more natural colour. Here, on the left side, I added more blur and a slight vignetting. My main inspiration for the final look were jellyfish, so I comped some elements from jellyfish with Screen mode, creating a nice rainbow feel and a colourful organic look.

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- Photo Source Paving
- Working Layers
- Texture Before Final Edits
- Tiling Diffuse Texture
- Tiling Bump Texture
- Tiling Normal Texture

Includes the original source image, prepared PSD Working layers to support this tutorial as well as the Seamless Diffuse, Normal and Bump Maps

Photoshop

Create seamless texture maps

What techniques work best when making a seamless texture from a geometric photo source?

One of the most fundamental requirements of a texture map is that it tiles seamlessly and correctly on both axes.

While there are plenty of standalone applications that can do this procedurally, I find the results of automated software less than pleasing due to the kaleidoscopic patterns or blurred blended areas that you often end up with.

When it comes to the creation of a seamless texture map, Photoshop may not be the fastest or easiest method to get from A to B, but for accuracy and realism, its in-house tools offer the flexibility and control to edit in stages and at your own pace.

Photoshop also offers a wide choice of tool sets that can do the same thing, albeit differently. So while I might prefer working with the Healing Brush tool, you may prefer the Clone, Patch or Stamp tool. Each work as effectively for the same tasks – the choice depends on what you are most comfortable or confident with.

Photorealistic textures, as the name may suggest, are derived from photographs either in whole or part. You can find stock photos from numerous websites or, if you're feeling particularly ambitious, shoot your own. Either way, deciding on the right photo to work with is the first and perhaps most important step when an artist is about to embark on a seamless texture project.

The start image should ideally have an evenly distributed light source with as few shadows as possible. Light gradients can make the task of seamless editing time-consuming, frustrating and sometimes impossible. Additionally, harsh, directional shadows will conflict with 3D maps later on down the line.

Creating a seamless texture from a photo can be relatively easy if working with organic materials such as terrain, as the colour and tone tends to be evenly distributed. This creates a forgiving canvas when it comes to photomanipulation.

On the other hand, the most difficult textures to tile are those that involve complex geometric patterns such as the mortar in a brick wall or the cracks in a paving texture.

Architectural grids and patterns must be aligned perfectly in order for the texture to tile, which can be intimidating, even for a seasoned Photoshop user.

There are a few techniques I tend to fall back on when faced with the task of tiling a tricky texture, and while I can't go through every single step in this brief tutorial, I have included PSD work files that I hope will help demonstrate a method that goes beyond the standard Offset filter process. You will probably find your completed texture differs a little to the one illustrated in this tutorial.

Try not to be overly concerned by this, as the goal is not to replicate mine, but rather to develop your own version of a tiling paving texture that looks authentic and realistic even when repeated.

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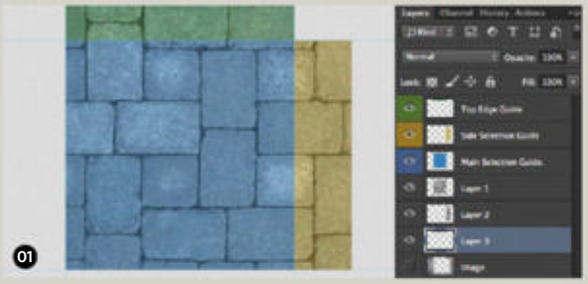

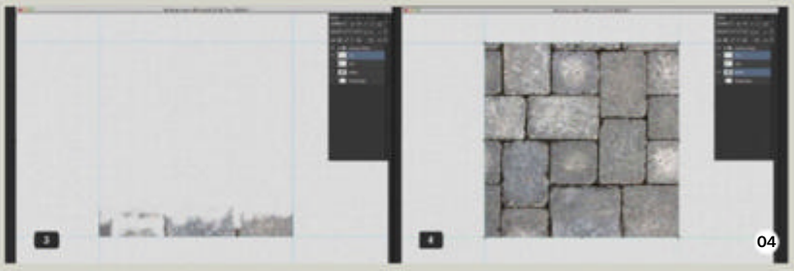

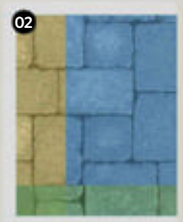

01 Prepare the working layers

Open the PSD file named 'Working Layers'. There are four layers, colour-coded to act as guides to aid in this tutorial: Blue: Middle Guide, Green: Top Guide, Yellow: Side Guide and Grey: Paving. The paving layer is the actual photo source we'll be creating our seamless texture from. Whenever you make a selection using the colour guide layers, always ensure the Paving layer is the active layer. In the Layers palette, Ctrl/Cmd-click the blue Middle Guide thumbnail. This creates an automatic selection around the blue guide. With the Selection Marque tool and Paving layer active, Ctrl/right-click somewhere in the marching ants on the image and choose Layer via Cut from the drop-down menu. You should now have a square area cut from the paving source on its own layer – name this 'Middle'. Repeat this process with each of the selection guides and name the layers 'Top' and 'Side'.

02 Align the layers

You can hide or delete the Guides and Paving layers now, as they have served their purpose. I'll continue to use the colour guides for illustration purposes in this next step. In the Layers palette, move the Middle layer so that it sits below the Top and Side layers. Currently, the Side and Top layers are positioned outside of the Middle layer, so we need to position them to sit inside and on top of it. They also need to be moved to the opposite sides. Remaining within the Photoshop Guide boundaries, use the Move tool to drag the Top selection to the inside-bottom edge and the Side selection to the left-inside edge.

03 Create a side seam

We can already see how swapping the positions of the Top and Side selections works towards the creation of the new tiling seams. The Side layer is almost perfect – we just need to do a little editing in the top-left corner where there is a visible edge. We also need it to blend in with the paving layer beneath it. Turn off the Top layer so we can see and edit the Side layer. Select the Eraser tool with a soft round brush set to approximately 80 pixels. Reduce the Opacity to 50% and start to delete the visible edges from the Side layer. You can see the parts I deleted from the Side layer in Image 1. Image 2 displays how both layers look when they are visible. As you can see, the two sections blend very well.

04 Build the top seam

Turn the Side layer off and the Top layer on. You may notice that the cracks in the paving from the Top layer do not align perfectly with those from the Middle layer. For now, repeat the process of deleting the obvious layer edge. It might help to reduce the Top layer opacity in the Layers palette so you can see the layer beneath as you work. In Image 3 you can see the areas I have deleted from the Top layer. Image 4 shows how the Top and Middle layers look when active. Now it's time to turn these layers into an actual texture so we can check the seams and, if required, work with photomanipulation tools.

05 Merge layers and save the texture

In the Layers palette, click in the area next to the Top, Middle and Side layer thumbnails. This will select and highlight all three layers. Ctrl/right-click in the highlighted area and select Merge Layers from the drop-down menu. All of the three layers have now merged into one. Click in the new layer thumbnail to make an automatic selection. Ctrl/Cmd-click+C to copy the selection into the clipboard. Create a new image sized 2,048 x 2,048 pixels. Ctrl/Cmd-click+V to paste the selection into the new image. Back in Layers, click the area next to the thumbnail and select Flatten Image, then Save As to your hard drive and name it 'Texture'.

06 Post edits

Go to Filter>Other>Offset and play around with the Horizontal and Vertical sliders to examine the texture for any obvious tiling or seam issues. I tend to use the Healing Brush tool set to Replace and select some grey stone material from the other flags to paint over the paler areas. By selecting a flag corner or crack from another area in the paving image, I can also paint over and replace areas that need it, such as a paving crack that's flawed as a result of earlier editing. Every time you edit your texture at this stage, run the Offset filter a few times to check for editing scars.

Image preparation is paramount

The paving image included in this tutorial had undergone some preparation before I included it in the PSD working layers. This was done to save time and text for this tutorial, but should not be overlooked when creating a tiling map from a photo source. Fixing obvious perspective distortion is essential to the success of seamless editing. If the original image is slanted or uneven, then the finished texture will be too. With regards to the technique in this tutorial, there are no rules when it comes to choosing the three sections from a photo source. It just so happened that with the Paving Image, the selections highlighted within this tutorial worked best. You may find in other photo sources that the bottom edge of your main selection tiles better than the top edge, and the same applies to the left or right. The only way to know which is best is to work with all of them.

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ESTIMATED TIME TO COMPLETE THE TUTORIAL
20 MINS

With the Disc

Tutorial files:
- LW_AO_Tutorial Scene
- LW_AO_Tutorial Objects

The scene that the tutorial was based on has been supplied. The dragon object and the floor have their AO shaders applied

LightWave 3D

Ambient Occlusion

"What is a good method for achieving an AO pass in LightWave?"

In this tutorial we will be covering how to set up an ambient occlusion pass in six easy steps with LightWave 11.5.

The purpose of ambient occlusion is to achieve accurate and defined shading on our 3D renders. It aids with the cohesion of the shading between objects in an environment to really make it feel like everything 'sits' properly in the scene. This is a great tool to help eliminate a typical 3D look and push your work to a richer and more refined piece of art.

After following this tutorial, anyone will be able to achieve a good-looking AO layer using LightWave 3D. The AO layer can then be added over your colour render using your favourite compositing package. All that is required is that the AO layer is set to 'multiply' over your colour layer. I find that an opacity value of between 30%-40% usually works well, but you should tailor to your own tastes.

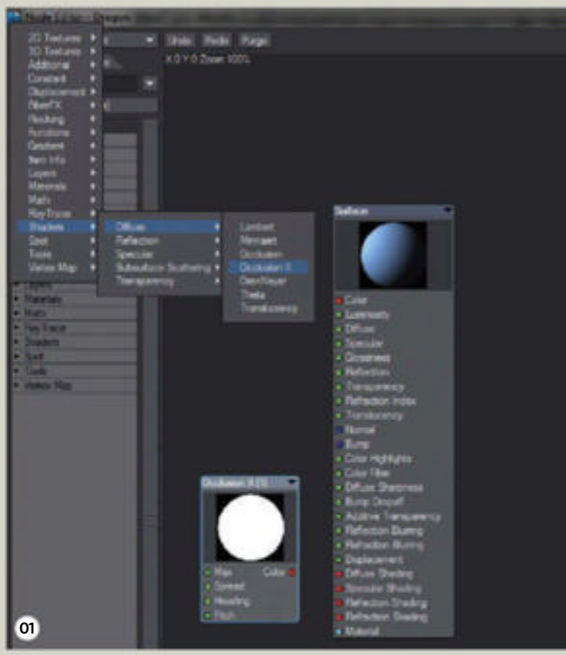
We love using LightWave 3D in our studio pipeline. Getting used to its intuitive design is an absolute breeze.

"LightWave 3D is an essential part of our daily workflow.," says Chris Schoultz, President of Animation for The Dreamvision Company/Character Matters. "It's very cost-effective, and the results it can produce are extremely competitive with the other major brands out there."

The model that we will be applying this treatment to is Friedl Jooste's creation, which he has kindly provided for me to base this tutorial around. He also rigged and posed the character for the purposes of this tutorial. The dragon had sculpting detail added to it by Lynton Levengood. Friedl and Lynton are part of our team at The Dreamvision Company/Character Matters, where Friedl is the head of animation and Lynton is our lead concept and texture artist.

01 Create an occlusion node

With the character object selected in LightWave Layout, we F5 to open the surface editor. Select the surface to which you would like to add the occlusion shader, which in this case is called 'Dragon body'. Click on the 'Edit nodes' button – this will open up the node network window. Click on 'Add Node' in the top-left corner, and follow the drop-down list to the 'Shaders' option. Follow through to 'Diffuse', and then select the Occlusion II shader.



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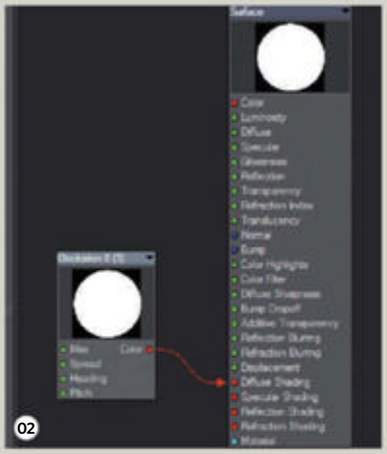
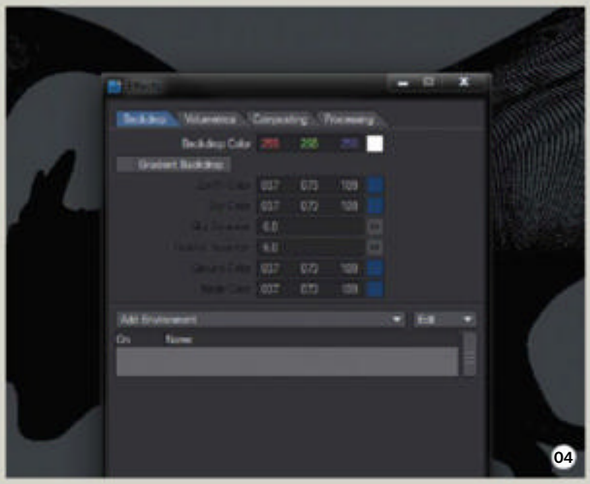




Resolution considerations

In scenes that don't have fine detail, a way to save on render time – especially if you are rendering an animation – is to half the size of the frame to that of the colour layer. This can save you hours of rendering time and produce a good looking final product. All you would need to do is to scale up the AO pass with a resize tool in your composite before multiplying it over your colour layer. Also, because it's half the size, it means that in most cases you can get away with using half the amount of anti-aliasing of that which you used in your colour layer.

02 Add to the surface

Next, click and drag on the red dot next to 'Color' on the Occlusion II shader. Connect the line to the 'Diffuse Shading' channel. This will override the surface with the Occlusion Shader and enable the surface to behave the way we need it to. There are other ways to apply AO in LightWave 3D, but this is the way I prefer based on the look that this particular shader can produce for our AO pass.

03 Define scale

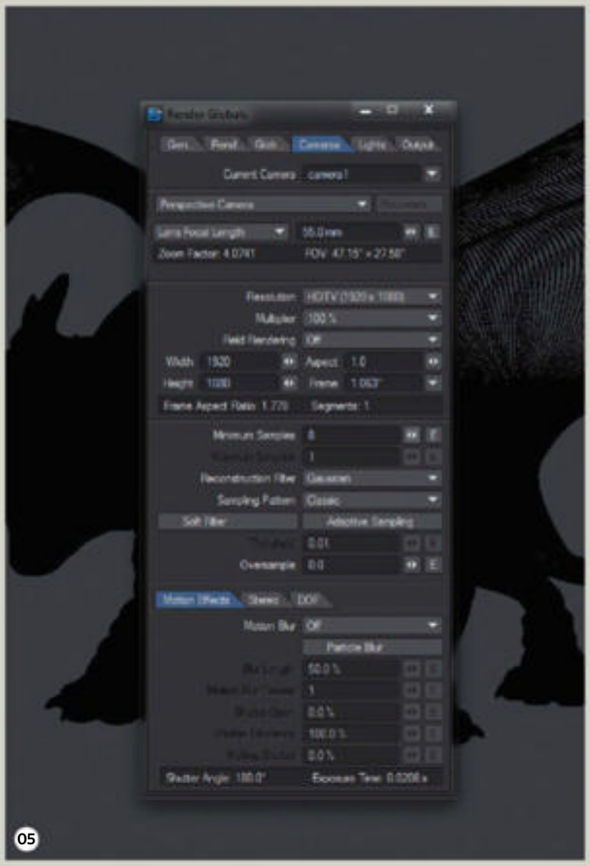
Now, double-click on the shader. Here, we are presented with a drop-down menu to specify the 'mode' in which we want to let the shader behave. For our purposes, I will be using the 'Range' mode. This will allow me to find the level of AO darkening that I am happy with for my image. The 'Infinite' mode doesn't take the distance of objects between each other into consideration, and as a result can come out way too dark in some cases. This mode is also not advisable for interiors, as it can produce pure black results. I now repeat the first three steps of the tutorial on all the surfaces of the dragon.

04 Enviroment treatment

Next, we need to make sure that for the AO pass we set the environment backdrop to pure white. This will assist us when we add the AO pass as a 'multiply' layer in our compositing package, as it will only take the dark parts of the layer and apply that over the colour image. It is also important to note that if you are working with a level of distance fog in your scene to include the distance fog on the AO, otherwise you will find when compositing your image that the AO is running over your fog, which won't look right. Just be sure to set your fog colour to pure white for the AO pass.

05 Render settings

LightWave has gone to great lengths to ensure that the sampling part of the workflow is as simple and optimised as possible, resulting in many less test renders and tweaks to get a good clean result. By default, Shading samples are set to eight samples in the Render Globals. All we need to focus on is adding enough anti-aliasing to get a clean result. 8x AA should work fine for this character. Also, be sure to have Noise Reduction switched on in the Render Globals for that extra bit of polish on the AO. It could also result in having to use less anti-aliasing depending on your scene.



06 Add AO in your composite

Now, you can simply load your rendered out AO layer into your favourite compositing package and merge it to your colour layer with a 'multiply' method. Tweak the opacity of the AO until you are happy with how it sits. That's how simple it can be to achieve an AO pass in LightWave 11.5. These steps are the basics that lay the foundation for dealing with even more complicated scenes. Fast and user-friendly techniques like this are always welcome in any animation pipeline.

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ESTIMATED TIME TO COMPLETE THE TUTORIAL
2 HOURS

With the Disc

Tutorial files:
- ffx particle src001 Parameters.jpg
- ffx particle src002 Parameters.jpg
- General parameters.jpg
- Illumination parameters.jpg
- Rendering parameters.jpg
- Simulation Parameters.jpg
- Particle View Parameters.jpg

The attached files will help you to configure correctly the parameters for these kind of VFX explosions

FumeFX, 3ds Max

FumeFX explosions

"How can I achieve high-quality explosions in a few simple steps?"

When creating VFX explosions, there are various different types of software that one can make use of. However, one of the most commonly used is FumeFX.

FumeFX is a fluid dynamics engine created for simulation and rendering of realistic fire, smoke, explosion and other gaseous phenomena.

In the first instance, it may seem relatively simple to use, but when we start to dig deeper into the subject it becomes more difficult. This is due to the large number of parameters that can be experimented with for each new work.

It is important to note that through trial and error, we can get different explosions by changing parameters as Time Scale or initial temperature. Try playing with the various parameters to see what we mean.

According to the different types of explosions, we can add FFX particles into the FumeFX UI with the help of Particle System in 3ds Max. All you need to do is add PF Source and Particle Src. Now, you can attach PF Source into Parameters> Particles in Particle Src. In the option of Particle View (Key=6) you can configure these parameters in order to get separated particles of fire from the main explosion via speed, direction, rotation and birth, or instead add new operators.

There are different types of explosions that will depend on the turbulence used, and we can also add parameters such as wind, as well as some others that might be helpful. Sometimes we have the help of operators in particle view or the assistance of internal parameters in FumeFX. Don't forget to add the FFX sources as lights in FumeFX using Pick Object or Pick Light. If you forget to attach them then nothing will actually appear in your final renders.

You must use an approximate value of spacing = 1.5, quality = 5 and Maximun iterations = 100. This will enable you to get a rough simulation of what you want without having to overload the CPU and memory RAM. Once you have a good explosion and are happy with the fuel and smoke, you can start to increase those initial values. You should pay attention to the rendering parameters, such as opacity on fire, smoke and Multiple scattering. These values will be critical to achieving a real-looking fire and in turn depend critically on the values of spacing.

In fact, you may not get the desired explosion during simulation, but by changing the values of the rendering parameters and experimenting with different options, then you will be able to achieve the final look you're after.

01 Create the workshop environment

Once in 3ds Max, go to Create>Geometry and Select FumeFX. Select Open FumeFX UI and create an approx box of W: 500, L: 500, H:900, or the parameters you desire. Now, go to Geometry>Particle System and select PF Source. Now go to Helpers> FumeFX and select Particle Src. Duplicate Particle Src and PF Source as copies.

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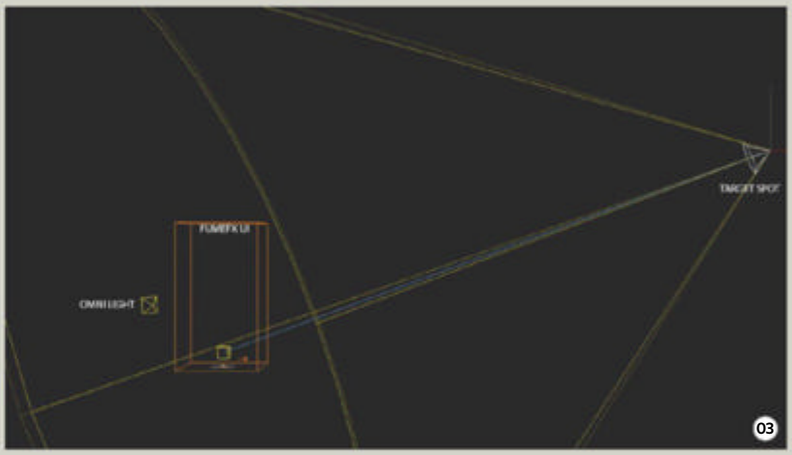


02 Add Objects/Sources into the FumeFX UI

Now it's time to add the Particle Src into FumeFX UI. This step is really important because FumeFX UI interprets this as particles. Select FumeFX UI (the box) –in / Modify- and hit Open FumeFX UI. Go to the Obj/Src tab and select the icon with a small hand, Pick Object. Now select Particle Src001 and Src002 in the viewport. Once you've added Particle Src001 and Src002, select Particle Src001 go to Modify> Parameters>Particles, select object PF Source 001 and then repeat the same process with Particle Src002 by picking the PF Source 002.

03 Add new lights

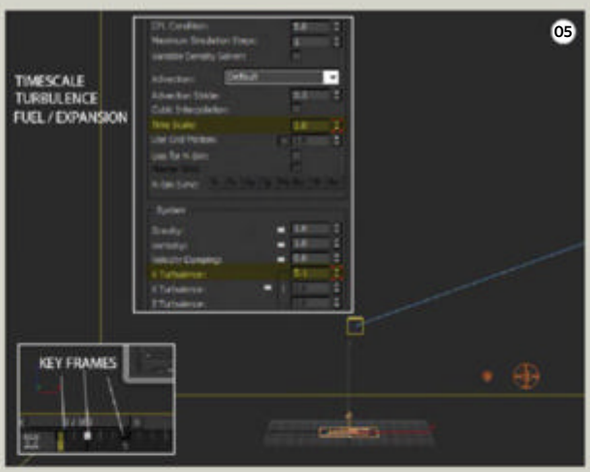
Now to add the new Target Spot light. Activate Shadows/ Ray traced shadows and also activate Shadow Atmosphere into – Shadow Parameters and Multiplier=2. Add an Omni light with the same parameters. Note that the Light Cone needs to cover the area of FumeFX UI (Box). In the FumeFX interface, go to the Ilum tab and pick these current lights as new lights. Go to Render Setup>Assign Renderer and select Default Scanline Renderer. I have used this setup in for the final render that you can see on the opposite page.

04 Objects/Src Parameters

Keep the default values – I have only written the values that I have changed. Select FFX Particle Src001 (Radius = 15, temperature Amount = 1000, Smoke Amount = 6). Select FFX Particle Src002 (Radius = 5, Fuel Amount = 100. In the right side of Fuel Amount you will see a small square. Right click on it and select Voxel Smoke). Open Particle View (keyboard = 6) and in the boxes Event 001 & 002 you need to get the next operators (Birth, Position Icon, Speed, Display and Delete). If you have others, right-click on them and delete. Check out the images supplied with the disc for each Particle View parameter.

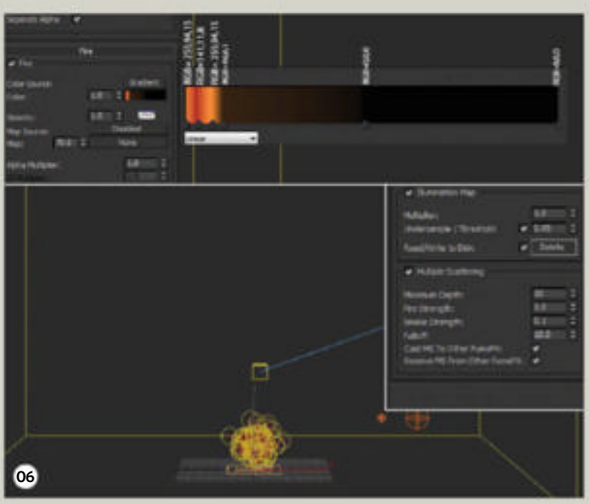
05 Simulation parameters

Select Auto Key below the Timeline. Autokey will appear with a red colour. Change the next parameters: Keyframe sec = 0 go to SIM>Time Scale = 1; System>X Turbulence = 5.1; Fuel>Expansion = 2.0. Keyframe Sec = 2 and change Fuel> Expansion = 3. Keyframe Sec = 5 (Time Scale = 2; System>X Turbulence = 0.1; Fuel>Expansion = 2).



06 Rendering and illumination parameters

In the Rend menu, change the colour of fire as smoke (again, you'll be able to find the detailed parameters supplied with this issue). Also, don't forget to activate Cast Shadows, Receive Shadows in Smoke. Now you can activate in the Ilum tab Multiple Scattering following the parameters. Once you have configured these various parameters, go to Start Default Simulation. It's very important to keep in mind the values of Spacing because it will increase or decrease the use of RAM memory. Check out the disc images to follow the parameters used in this tutorial.



Control the explosions

One of the most important parameters to take into account when we add the sources Particle Src in FumeFX UI is the control of parameters like Fuel, Temperature and Smoke. These parameters will control the explosions in FumeFX, but you need to take into account the use of AutoKey in the Keyframe timeline. AutoKey enables us to increase or decrease the values of Fuel, Temperature and Smoke according to each second on the timeline. Try to read more about such parameters to better understand how they affect the final simulation.

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> 3D printing is changing the way we think about the manufacturing process

Group test: 3D printers

With 3D printers slowly taking over the world, 3D Artist decided to put four top models to the test

It's difficult to understate the importance of 3D printers in today's world. From incredible medical innovations to eco-friendly 3D printed cars, this new technology is slowly changing the way we think about the manufacturing process, heralding in a new future where mass production needn't be as expensive or as resource guzzling as the traditional methods employed over the years.

However, 3D printing tech needn't be the sole domain of huge creative companies. Thanks to the dawn of affordable desktop printers, artists too can use the technology, embracing it for everything from jewellery design through to the creation of home-printed 3D shoes. As such, 3D Artist has put four of the top desktop 3D printers under the microscope. Turn the page to see which model might best suit your home 3D printing needs...

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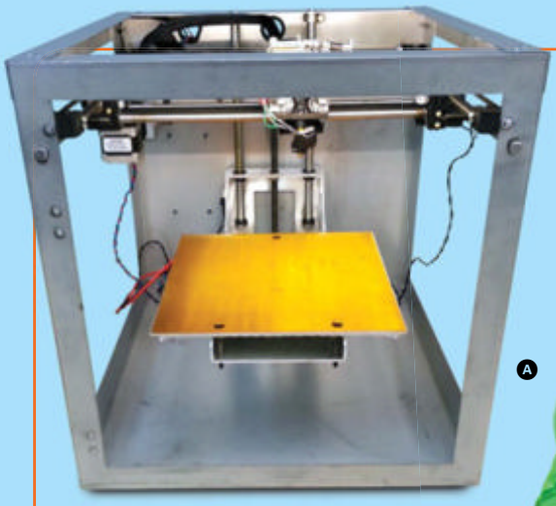
Contributors from iMakr:
Nadia Dewitt, Steve Loveridge, Sylvain Preumont

All prices were taken from the iMakr website **www.imakr.com**

The 3D printing revolution

With a huge range of desktop 3D printers now available costing from as little as $499, professional quality 3D printing has become much cheaper and more accessible than many people realise. With at-home 3D printing said to be the beginning of the next industrial revolution, a variety of machines have recently flooded the market; from Choc Edge's Choc Creator V1, a printer that makes models out of chocolate, to the more traditional Fused Deposit Modelling printers, which make use of molten plastics bought in the form of filament to recreate what was, once upon a time, digital.

3D prints are measured in mm resolutions, with mm representing the thickness of the layers of material each machine deposits to create the model, which can be as fine as 0.2, 0.1, or even 0.025mm. Even so, different printers will produce different 0.1mm prints, and selecting a printer out of the many can be a surprisingly personal decision...



Solidoodle 3rd Generation

£769 store.solidoodle.com

The Solidoodle printers are some of the cheapest available today, with the second-generation Solidoodle printer retailing at just over £300. The new third-generation printer, however, introduces a range of technical advances such as compatibility with the open source 3D printing software Repetier Host, as well as an 8x8x8-inch build area with heated platform – double the volume of the previous printer. It's currently one of the most machine-like, stripped-down printers, offering technically and mechanically-minded users a variety of parameters to experiment with for the best possible print.

The main plastic filament used with the Solidoodle is ABS, a strong, flexible material with the notable advantage of being soluble in acetone, which enables users to smooth printed objects, create high gloss, or even glue parts of their prints together, though details on the print surface may be lost with excessive treatment. Users of the Solidoodle printer also have the option to print in the more naturally glossy and biodegradable PLA, though this is not recommended.

Solidoodle can print at a layer height resolution of 0.1mm for high-quality results and supports Repetier Host, which is directly downloadable for free on the official website for the printer. The 3D printing software enables users to control minute details of the printing process, such as how the infill of the printed model is created. For instance, this can be set up to be structured in a hexagonal pattern to use less plastic. Repetier Host also enables Solidoodle users to lower the density of the support plastic that holds up the parts of the 3D printed model during printing, meaning the support can be more easily removed once printing is complete. If users wish, they can turn off the supports completely. A rather nifty feature is that Repetier Host also offers users a visual representation of the motions of the printer nozzle in real time, offering a cool glimpse into the inner workings of the Solidoodle.

The good & the bad

- ✓ Cheap price
- ✓ Customisable with Repetier Host
- ✓ High quality print resolution for an affordable price
- ✓ Arrives fully assembled and ready to print
- ✓ Low power consumption of 110-120W
- ✗ Needs to be connected to a computer
- ✗ Can only print with ABS. PLA is not recommended but possible
- ✗ Not as much user support, such as alack of an official forum

Info

BUILD VOLUME 200x200x200mm
PRINTER SIZE 305x305x290mm
RESOLUTION 0.1-0.3mm
MATERIALS USED ABS recommended, but PLA is possible
WEIGHT 9kg

Verdict

Features	7/10
Ease of use	6/10
Build quality	8/10
Value for money	9/10

Final Score 7/10

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Felix 2.0 with Display Unit

£1,440 (fully assembled)
www.felixprinters.com

OUR TOP CHOICE
Customisable, user-friendly, and easy to use

C

Felix 2.0 is one of the most recently launched desktop printers, and easily comes in as a favourite for the 3D Artist team. The Felix 2.0 is an industrial quality printer which can also be for personal use thanks to its desktop-friendly size and incredibly quiet printing capability. Although the printer is larger and may look very bare in an aesthetic sense, it is actually incredibly user friendly.

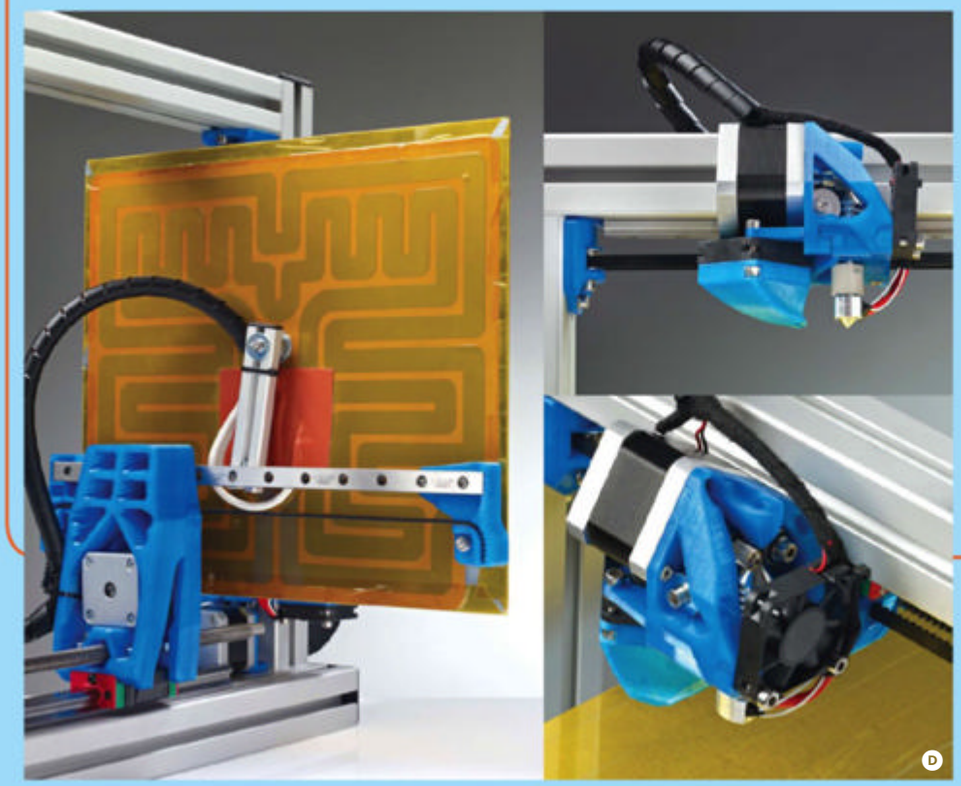
In fact, the Felix 2.0 introduces a Display Unit and a mini SD drive so that it does not need to be constantly connected to a computer. Users can also fine tune elements such as the temperature and the speed of the printer as it's in motion.

The Felix 2.0 features a sizeable 255x205x235mm build volume and can extrude plastic in a huge range of temperatures going up to 280 degrees Celsius, which makes it very suitable for printing with both ABS and PVA plastics, as well as dissolvable natural PLA. The Felix 2.0 can also print in a large range of resolutions, from the very high 0.05mm to 0.4mm; although to print a fairly object in the highest resolution may take as long as 50 hours, despite the printer's rather fast 200 mm/s maximum print speed.

The Felix 2.0 works using Pronterface and Repetier Host and has been designed to include some 3D printed parts, as well as an in-built handle to make it more portable. Felix 2.0 is only 7kg but sturdy with a rigid aluminium frame built to withstand the highest accelerations of the moving parts, and comes fully assembled or in the cheaper DIY Kit option from the Felix Printers official website (www.felixprinters.com).

The good & the bad

- ✓ Large range of printing plastic types
- ✓ Wide range of temperatures
- ✓ Very high 0.05mm resolution available
- ✓ Ability to use mini SD card and display for standalone printing
- ✗ DIY version not quite as user-friendly. Assembly time is 4-12 hours
- ✗ Display unit is optional, and costs a little more
- ✗ Not quite as robust looking as other printers


D

Info

BUILD VOLUME 255x205x235mm
PRINTER SIZE 450x500x530mm
RESOLUTION 0.05-0.3mm
MATERIALS USED ABS/PLA, soluble natural PLA filaments possible
WEIGHT 6.7kg

Verdict

Features	9/10
Ease of use	8/10
Build quality	9/10
Value for money	9/10

Final Score 9/10

A The Solidoodle 3rd Generation printer is one of the cheapest professional machines available today

B The latest Solidoodle Printer has an increased 8x8x8 build platform

C The blue components of the Felix 2.0 are actually 3D printed themselves

D One of the big innovations in the Felix 2.0 is its refined Z-axis resolution

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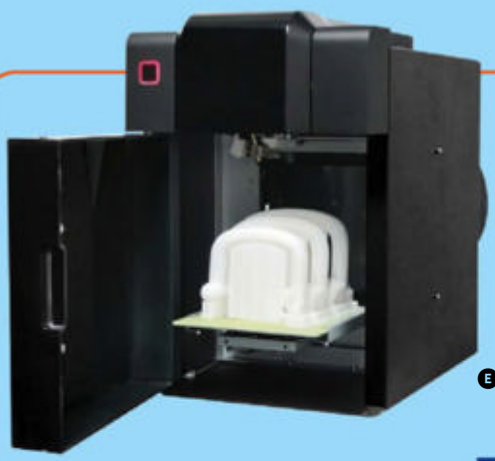
Modelling tips for the best results

Whatever printer and resolution is preferred, the user can further perfect the printing process with 3D modelling techniques to produce the most accurate print out possible. A common problem is model distortion after conversion into a print ready STL file format, where the mesh becomes triangulated. Netfabb, an open source conversion software that prepares models for printing, will automatically repair even complex files. Nonetheless, it is advised to keep good topology flow when modelling for 3D printing as well as keeping triangle counts as low as possible. Another technique is to rotate the model before printing so that areas of least importance are printed last. A printer will deposit melted plastic in circles of progressing height, so if for instance the model is of a mask and you leave it facing up, the nose will be the last to be printed and you might find a remainder of the plastic at its tip. Modelling a huge block at the base of the model should also be avoided – as the block cools at the bottom while warm plastic is still being deposited at the top, it might contract at the sides, causing a deformation. iMakr technicians encountered this problem when printing out parts of a train as solid shapes. Different printers have started tackling this problem with glues and heated beds, but for the train set the technicians simply modelled windows in the train, creating holes in the plastic that avoided further problems during printing.



E

Up! mini

£840 www.pp3dp.com

The Up! mini is a compact and consistent printer, utilising a great brand of filament with excellent quality and range of colours. With a compact 4.7x4.7x4.7 inch build size, this printer weighs only 6kg and promises prints within 15 minutes of turning it on. Quiet enough to be able to work within an office environment, the Up! mini is all about user-friendliness. It utilises ABS plastic to print in its own neatly enclosed compartment, although PLA is also possible while not coming recommended. Though the ABS plastic used is of excellent quality, coming in a huge range including a glow-in-the-dark option and a white ABS plastic which can be dyed with clothing dye to bespoke colours; like all 3D printers the quality of prints may be compromised by models contracting as parts of the object cool at different rates.

However, the Up! mini's closed compartment can help to minimise this effect by keeping the internal temperatures constant during printing, and if the user prefers to print without it the compartment may easily be set up to be open. Along with the Up! mini's heated build platform, which includes one of the fastest heating times on the market, the user can use these features to prevent warping without needing to change the geometry of their model. The printer's compartment also adds an element of safety to the print by making it more difficult to be touched or moved during hours of printing, making for a far more child friendly option for school environments. The Up! mini comes packed with its own Smart Visual Print Driver software that offers many of the same options as Repetier Host. It also features USB connectivity, which gives users freedom to turn the computer off while printing and even to use the printer without it needing to be connected to a computer at all. It's a huge benefit when waiting on long prints.

F

The good & the bad

- ✓ Compact size
- ✓ Closed compartment, which allows for better internal temperature
- ✓ Can be used without needing to connect the printer to a computer
- ✓ Arrives fully assembled. You can start printing objects in 15 minutes
- ✘ 3D printing software not as customisable as others
- ✘ Can only print ABS. PLA is possible but not recommended
- ✘ Raftless printing is not available, only lower density smart supports

G

Info

BUILD VOLUME 120x120x120mm
PRINTER SIZE 240x335x340mm
RESOLUTION 0.2-0.35mm
MATERIALS USED ABS recommended, but PLA is possible
WEIGHT 6kg

Verdict

Features	7/10
Ease of use	9/10
Build quality	7/10
Value for money	8/10

Final Score 7/10

E The Up! mini offers a closed compartment for printing

F Most 3D printers are capable of producing some incredibly complex models

G This Eiffel Tower model is almost a metre tall!

H The Creatr is one of the few printers with the ability to print two colours simultaneously

I The Creatr can print intricate objects with easy-to-remove soluble support

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LeapFrog Creatr Dual Extruder

£1,540 www.lpfrg.com

The unique selling point of the Leapfrog is that users can easily print in two different colours or materials simultaneously thanks to the printer's dual extruders. This is very exciting when it comes to the quality of the 3D models produced as the Leapfrog can use one of its two nozzles to solely print support material when printing, which can be created in a soluble PLA or PVA filament, and can later be dissolved in water. This means that complex models with gaps and hollows can be created, without leaving any ugly marks on the object's surface.

Leapfrog prints are solid and accurate, and as another printer that uses Repetier Host combined with its dual extruders, LED lit heated print bed and strong aluminium frame, the Leapfrog offers users more artistic freedom without added difficulty. With a large 230x270x200mm build size, a high speed of 200 mm/min, a 0.05mm positioning accuracy and a minimum layer thickness of 0.15 mm, the printer can produce very creative and interesting results. User support for the Creatr is also notable, with everything from a user forum, videos to help users install and print within 30 minutes, and troubleshooting guides available directly on Leapfrog's official website (www.lpfrg.com).

Two pieces of software are used for the Leapfrog printer, both of which can be downloaded for free. Ardruino is used to make sure the Leapfrog and computer can communicate and the Leapfrog Repetier software with slicing plug-in Slic3r allows adept users to modify the G-Code programming language used for 3D printing and experiment with multiple print settings.

The software is also designed for people working with different filaments and build styles, with user configurations able to be saved as presets and micro layering increasing the accuracy of the print. These features come at an increased cost, though.

The good & the bad

- ✓ Dual Nozzles enable users to print in two different materials and colours
- ✓ Arrives fully assembled and pre-calibrated. You can an print your first object within 30 minutes
- ✓ Great user support for the printer included on the company website
- ✗ The most expensive of the printers
- ✗ High power consumption compared to the others of 400W
- ✗ Needs to be connected to a computer while printing
- ✗ Heavy, at 32kg

Info

BUILD VOLUME 230x270x200mm
PRINTER SIZE 500x600x500mm
RESOLUTION 0.15-0.35mm
MATERIALS USED ABS/PLA, soluble filaments possible
WEIGHT 32kg

Verdict

Features	8/10
Ease of use	8/10
Build quality	9/10
Value for money	7/10

Final Score 8/10

The Felix 2.0 is commendable for its low level of noise, speed, rigid aluminium frame and large build volume

Our top pick

3D Artist picks the Felix 2.0 as our printer of choice. It prints very quietly and offers a large printing area, an impressive 0.015mm printing resolution, a huge range of temperatures and printable material types, and high printing speeds of up to 200mm/s. The Felix 2.0 also combines customisability for the more technically minded with user-friendliness. There's also the fact that it can come fully assembled and with a display unit and mini SD card that enables it to print easily without needing to be connected to a computer. Its 3D printing software, Repetier Host, is also very comprehensive, offering the option to experiment with parameters and manual controls, but also to be used in a much more user friendly way with its range of preset print modes. The fact that the Felix 2.0 design includes some 3D printed parts is an added talking point! Right now, it's one of the best 3D printers out there.

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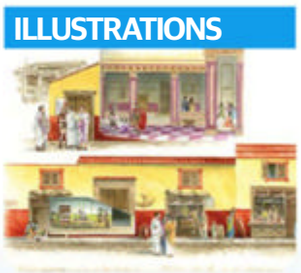

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Poser Pro 2014 / Poser 10

Built by the artist for the artist, new additions such subdivision surfaces make for a worthy upgrade

REVIEW BY Paul Sutton, 3D artist

Poser has been a powerful but undervalued tool for many years. However, in this, its latest version, the 3D rendering and animation software has been taken to the next level. If you were a user of Poser before, you're going to be very happy with the improvements that have been made here.

As a Mac user, it's fully Intel 64 bit, and with Subdivision Surfaces – brought to you by Pixar's OpenSubdiv library – it allows artists the power to define subdivision levels of polygons, something that smooths out those pesky character skin folds and offers full control over how the body behaves. This enhances the already impressive realism available through rendering with sub surface-scattering and ray tracing.

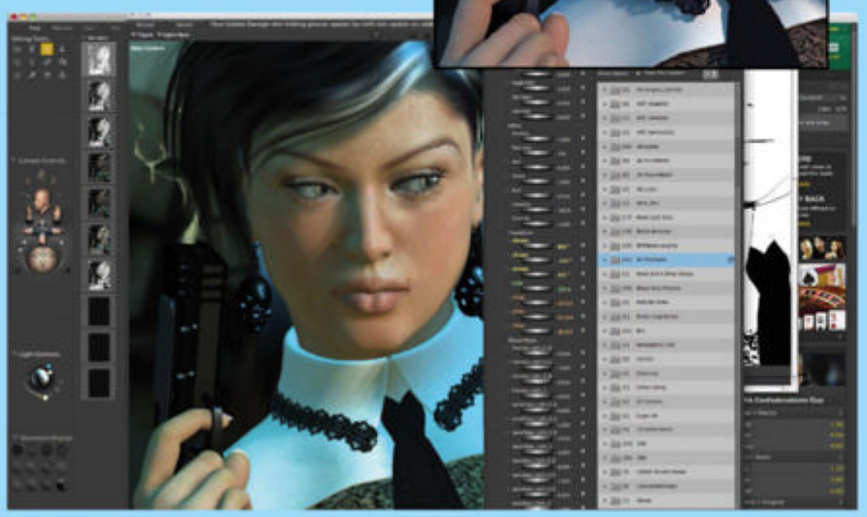
The Poser Pro edition now comes with a 'fitting room' where adding any existing clothes to a Poser character is only a few clicks away. With thousands of free, third-party models and props to be found, including clothes and hair, Poser offers so much more. Both editions come with over 5GB of free content, including 80 characters to get you up and running.

Before any large productions renders I like to preview my images first. This ability has now been supercharged using the new Live Simulation rendering, using ray-traced or preview animation through Bullet Time. You won't be let down either by the main scene window where you pose your characters. It's very impressive, and offers users a clear vision of the scene as you move, pose, and arrange your work.

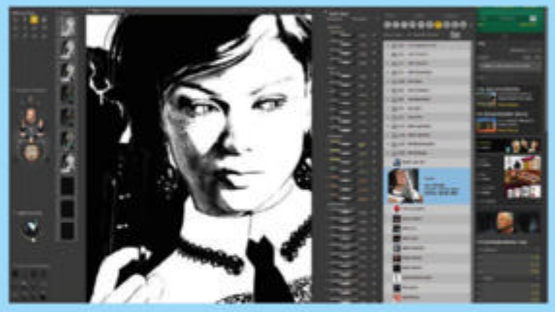
A new Comic Book Preview Mode allows enables comic illustrators to generate colour or black-and-white art using line controls and shading effects. It comes equipped with an intelligent threshold filter that allows for quick changes and creates consistent shading throughout the image. It's a feature that could certainly come in handy for the community of independent comics and fantasy artists out there.

Personally, I've always found Poser's functions, workspace, and workflow have a very short learning curve, so most artists should find they're producing great-looking CGI renders with this software in weeks instead of months. For fans of Poser, it's a great and well considered update.

Smith Micro's New Poser's features help you get closer to rendering reality



The main preview screen is impressive in its own right – clearly displaying your scene's surfaces without needing to use any other function or preview



Poser now offers the ability to do a Comic Book Preview of your scene in various tones, highlights, and in Colour and Black and White

Essential info

Price: Poser 10: $299.99/£192*
Poser Pro 2014: $499.99/£319*

www.poser.smithmicro.com

OPERATING SYSTEMS

- Windows XP, Vista, 7, or 8
- Mac OS X 10.6, 10.7, or 10.8

OPTIMAL SYSTEM REQUIREMENTS

- **Windows** 1.3 GHz Pentium 4, Athlon 64 (1.65 GHz or faster recommended), 1 GB system RAM, OpenGL enabled graphics card, 24-bit colour display, 3 GB free hard disk space
- **Macintosh** Mac OS X 10.6, 10.7, or 10.8, 1.5 GHz Intel Core processor, 1 GB system RAM, OpenGL enabled graphics card, 24-bit colour display, 3 GB free hard disk space

The good & the bad

- ✓ Ease of use out of box
- ✓ Thousands of free props and morphs to download from a large community of artists
- ✓ Comes with over 5GB of free content including 80 characters
- ✓ Reasonably priced
- ✗ Slow rendering when you use all the new features
- ✗ Some bugs in this release, but an upgrade will likely become available soon
- ✗ Not all features are included in the Poser 10 release

Our verdict

Features	8/10
Ease of use	8/10
Quality of results	7/10
Value for money	9/10

"An impressive upgrade for existing fans of Poser"

Final Score 8/10

*Price conversion correct at time of printing

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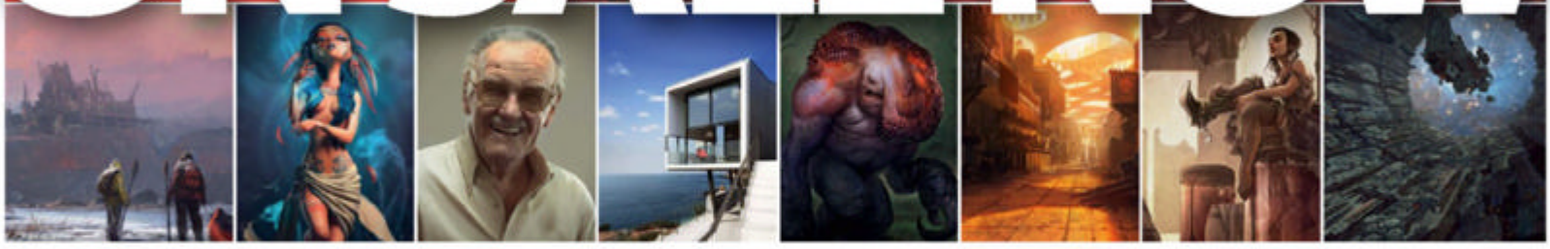

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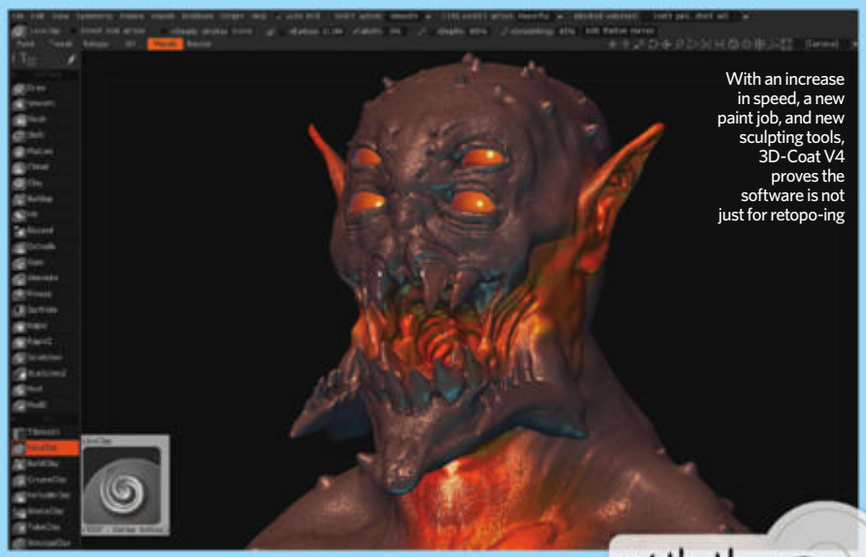


With an increase in speed, a new paint job, and new sculpting tools, 3D-Coat V4 proves the software is not just for retopo-ing

3D-Coat V4

With the Disc
Try out 3D-Coat V4

Dynamic tessellation and voxel sculpting join forces as 3D-Coat V4 unleashes a superpower of possibilities

REVIEW BY Pierre Rogers, character artist

3D-Coat V4 is the latest version of the digital sculpting program from Pilgway, designed to create free-form surfaces liberated from topology constraints. It does so with the use of Voxels, in addition to automatic and manual retopology tools, along with paint and UV capabilities. Though mostly recognised for its retopology tools, Pilgway has its crosshairs firmly fixed on sculpting for this iteration.

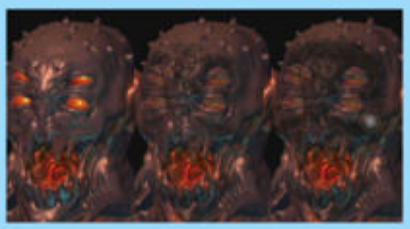
3D-Coat V4, offers plenty of tweaks and updates along with an overall increase in performance, but the star of this release is easily Live Clay. On the surface side of Coat's sculpting tools now resides a Live Clay section of brushes which deliver Sculptris-like dynamic tessellation, enabling you to detail your sculpts by adding extra geometry only where it's needed and delivering results on par with 3D-Coat's competitors.

LC brushes are very responsive and easy to grasp, and as in Sculptris each brush has a detail gauge. However 3D-Coat's detail gauge is linked to your brush size only, and will stay consistent whether you are zoomed in or out from your model.

Among the brushes for this new feature lies the amazing General Brush. The General Brush is a simple yet powerful palette that enables you to create a custom brush with the influence of up to seven brushes and many other tweaks. Last but not least is the Clean Clay brush, which lets you dynamically reduce geometry using four different modes.

Other notable additions include the ability to paint on voxel models, a Magic Wand tool, Coloured Specular and Emissive Layer blending modes, a resolution multiplier for editing paint projections in external applications and new face extrude in retopo tools. Meanwhile, new Vox Layer and Vox Extrude tools allow surface creation similar to ZBrush's Extract feature, and there's a much-needed polish to the UI, now complete with new button icons for brushes and materials.

To conclude, 3D-Coat continues to pack a punch at half or even a fraction of the cost of its competition, with a learning curve that ranges from easy to moderate. Detailing with Voxels is still far from efficient but coupled with the addition of Live Clay, 3D-Coat offers some serious sculpting power. With a great selection of features supported by effective painting and UV features, impressive Autotopo functionality and other retopology tools, support for eight different languages, Ptex support and UI customisation, we're happy to say that 3D-Coat V4 is well worth its asking price.



The Live Clay brush explores the use of dynamic tessellation to reduce geometry on the fly

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Essential info

Price: £261/$349*
www.3d-coat.com

OPERATING SYSTEMS
- Windows 2000, XP, Vista, 7, 8
- Mac OS 10.4.5 (Intel) or later
- Linux

OPTIMAL SYSTEM REQUIREMENTS
- CPU: 1.2GHz or better
- RAM: 512MB (4096 recommended)
- Video: Radeon 9600/Nvidia 5600 128MB (256 recommended) or better
- DirectX 9.0c or better for Windows, OpenGL 2.0 for Mac OS

The General Brush is a powerful palette featuring several parameters to create interesting custom brushes. These can be saved for later use in the Presets palette

The good & the bad

- ✓ Live Clay brushes are great
- ✓ Increase in performance
- ✓ Improved UI
- ✓ Magic Wand tool is very handy
- ✓ External application projection multiplier
- ✗ Default shaders aren't the best
- ✗ Non-standard colour wheel
- ✗ Live Clay could use an auto reduce function
- ✗ Render Room leaves you wanting more

Our verdict

Features	8/10
Ease of use	9/10
Quality of results	8/10
Value for money	9/10

"3D-Coat has the tools to make 3D asset creation easy, at a price that simply can't be beaten"

Final Score 8/10

*Price conversion correct at time of printing

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Artist info

RenPeng Dong

Personal portfolio site
www.oldrhyme.cgsociety.org

Country China

Software used
3ds Max, Maya, ZBrush, Mudbox, Photoshop, V-Ray

"I saw an image on a website that was like a kind of transparent man blending with his background, which brought me this great idea... [I] decided to show the feeling of part drying paint, part real, part plaster"

Non-US readers turn to page 80

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workspace 3D

Inside guide to industry news, studios, expert opinion and education

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Industry news

Full details on the new KeyShot 4.1 update, the 2013 Mac Pro and Vancouver Film School's state-of-the-art campus

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Finger Industries

The co-founder of this Sheffield-based studio discusses the company's commitment to pushing boundaries in both illustration and design

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Petits Bouffeurs

We discover the animation techniques behind SHED's latest advertisement

110 Industry insider

Stefano Tsai

Senior 3D artist and concept designer Stefano Tsai tells us the story behind his career

> "A project may be led by one individual, but we all see it and all comment, so there's no hiding"

Marcus Kenyon comments on working as a small, tight-knit team at Finger Industries. Page 104

The Great Horse of Yarl
Finger Industries
Finger Industries co-founder Marcus Kenyon talks to us about the studio's original animation design

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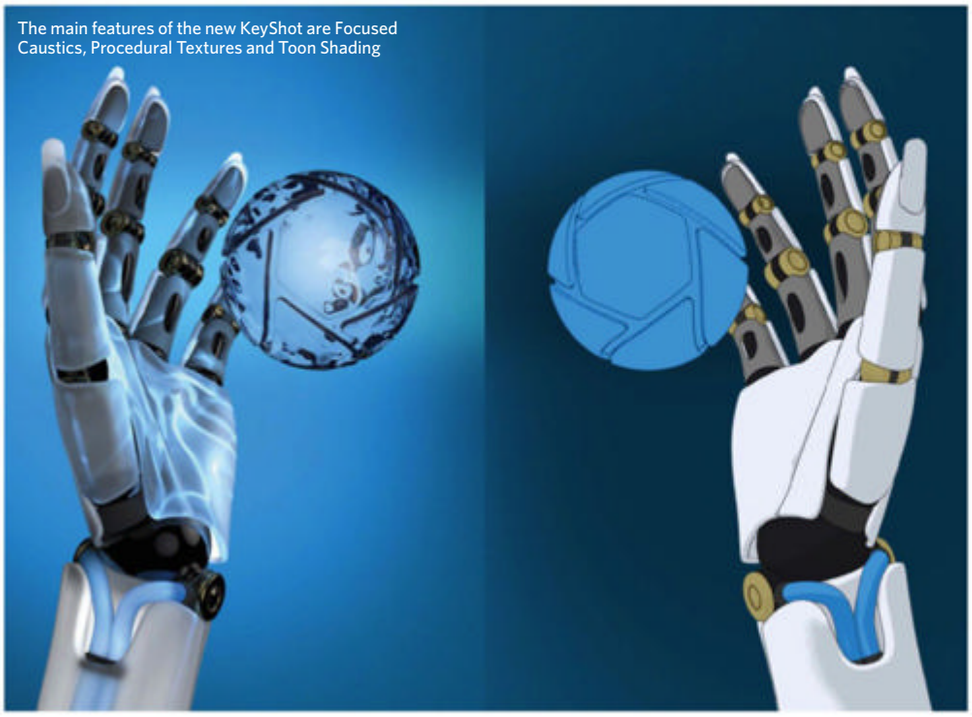

The main features of the new KeyShot are Focused Caustics, Procedural Textures and Toon Shading

KeyShot 4.1 announced

Luxion's first update after the KeyShot 4 release aims to extend the tools that make the software so powerful

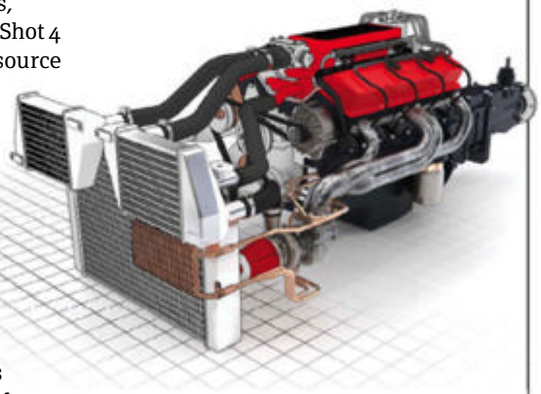
Luxion introduces new capabilities and improvements in the latest update to its animation and rendering software. KeyShot 4.1 aims to be the fastest and easiest software available of its kind, enabling users to paint directly on imported models and set up lighting, framing, and image background and camera settings to ultimately create 3D images in real time.

KeyShot 4.1 will add a new Focused Caustics feature to allow for the accurate display of the rays of light that reflect or pass through a given surface. The update will also include the ability to adjust the radius of cast shadows to modify their softness, adding to the physical lighting features in KeyShot 4 where any geometry can become a local light source with a point, area or IES light profile.

Six new preset procedural textures including Granite, Leather, Marble, and Wood will also be available, giving the user the power to adjust the scale and bump height, as well as sync the presets to other textures. Toon Shading has also been included in the release, with the non-photorealistic toon shader available as a material type for adding solid colours, shading and contours to objects. KeyShot 4.1 is available immediately starting at $995, or as a free upgrade to all existing customers.

Toon shading with the NPR shader

The non-photorealistic toon shader will be a material type included in Keyshot 4.1 that users can apply to give their objects a cel-shaded appearance. Many options will be made available to adjust the material's colours as well as the contour colour, angle, width and quality, with advanced options for contours and shadows.


Six preset procedural materials enable a user to immediately apply a seamless texture to any surface

New campus at Vancouver Film School

A 42,000 square foot state of the art campus to be introduced at Vancouver Film School this August

After $4.5 million spent in renovations, phase one of the new Animation and Visual effects campus will open to students in August. "We have reinvented the entire space from the ground up, turning it into a leading facility in the heart of Vancouver's bustling creative core," says Marty Hasselbach, managing director of the school. The new campus is 42,000 square feet, double the size of the current campus and will feature a 280-degree green screen studio along with a fibre network, two 72 feet theatres, editing suites, sound studios and a customised life drawing room.

"I am beyond excited to move into a new facility," says Marianne O'Reilly, head of animation and visual effects at VFS. "Our students go on to achieve great things in film, TV and games. They're making a real difference on the world stage, and I believe this space truly does their talent and work ethic justice."

In keeping with Vancouver Film School's naming convention, the new campus space will adopt the name '151'

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The all-new Mac Pro coming later this year

Apple gives us a sneak peak at the pro desktop

Apple's new Mac Pro is a break away from the Pro desktops of the past, offering users an entirely new design and functionality. At just 9.9 inches tall, it will be up to two times faster than the current Mac Pro, providing up to 12 cores of processing power and 40 GB/s PCIe bandwidth as well as up to 60GB/s memory bandwidth in ECC memory, so render jobs won't be stopped by transient memory errors. For graphics, Apple announced that the new Pro's dual graphics chips from AMD's FirePro range will allow VFX work to be done on three full-res 4K video displays at once; however tools such as After Effects and NUKE will need to be updated before they can take full advantage of all the new Mac Pro has to offer as they currently favour NVIDIA cards. Apple has not yet specified a price, only saying that the system will come out later this year.

The new Mac Pro has been engineered with a single fan to keep everything very cool with minimum noise

3D printing investment

UK government to invest £14.7 million into 3D printing

UK business secretary Vince Cable has revealed that UK 3D printing businesses are set to benefit from a big investment, one intended to develop R&D projects that make use of 3D printing technology. The Technology Strategy Board and Research Councils will provide £8.4 million for the projects with private investment adding an additional £6.3 million. The projects will last between one and three years, and will include developments such as specific facial implants for patients who have suffered from serious head trauma. "Investing in tomorrow's technology will bring jobs and economic growth," Cable said.

"This joint investment with the Research Councils highlights the commitment from across the sector to boost manufacturing in the UK" – Vince Cable

Unreal Engine evolved

New program brings together leading technologies

"The new Integrated Partners Program helps Unreal Engine 4 developers maximise their time with the most advanced toolset" – Tim Sweeney

With program members from more than 20 leading technology providers including Autodesk, NVIDIA, Intel, and RealD, the Integrated Partners Program is set to help shape the future of games. The award-winning Unreal Engine is already known for its cutting-edge graphics technology and world class toolset, which the Unreal Engine 4 IPP members will add to by providing developers with even more tools and features that are trusted for high-quality development. Integrated products for Unreal Engine 4 include Autodesk Gameware, SpeedTree for Games, Intel Threading Building Blocks and the RealD Developer Kit.

Software shorts

Bringing you the lowdown on product updates and launches

Animators' Toolkit for 3ds Max

Compatible with 3ds Max 2010 and above, the Animators' Toolkit is a suite of modular tools to rig, copy and manipulate animation. Animators can use features such as combinations of the Toolkit's 'Devices' to automate common tasks; along with Prism, the parametric curve editor, to control weights, timing, and transforms. Created by John Martini and Andru Phoenix, the Toolkit is priced at $25. Learn more at **www.animatorstoolkit.com**

Plant Factory Studio PR2

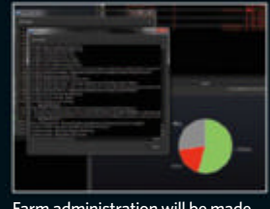
Plant Factory Studio, the stand-alone software that lets users recursively model, detail, and generate variations of plants of different ages among many other features, will be updated in the PR2 release to include full node and graph capabilities. The second pre-release of E-on Software's 3D Plant creation studio is available to be purchased for $995, with existing users able to receive the update for free. You can learn more about the software at **www.theplantfactory-tech.com.**

RealFlow 2013

Next Limit has launched RealFlow 2013, the latest version of its fluid simulation software. The major new release includes Hybrido 2, a brand new large-scale fluid solver, node based set-ups and quick built-in previews with Maxwell Render quality. The new software is priced at $3,995/€2,995, while registered RealFlow users can upgrade for $2,500/€2,000. Both include one year of support and maintenance. Find out more at **www.realflow.com/rf_2013.**

Deadline 6.0 ships

Thinkbox Software adds a new UI and cloud support to the latest version



Farm administration will be made easier in Deadline 6.0 with its ability to stream the render log

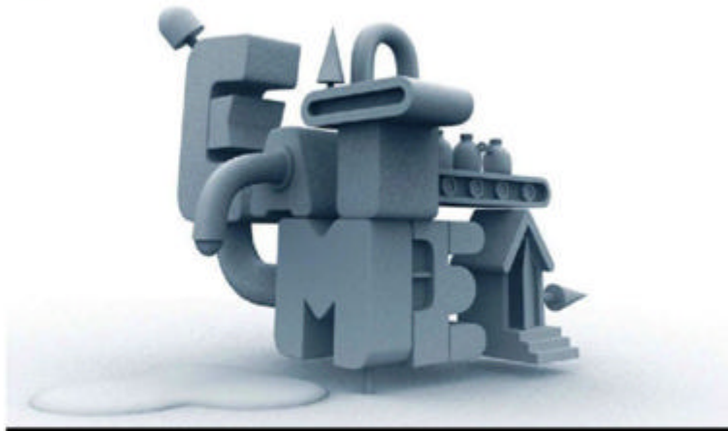
Compatible with a wide range of rendering packages, Deadline 6.0 is the latest update to the administration and rendering toolkit for render farms. The new release, which was originally previewed at Siggraph 2012, features a new highly scalable MonoDB database backend, a redesigned UI, graphic data representation, a streamlined archiving system and Amazon EC2 Cloud support built in. Each deadline node license costs $185 or $75 for an upgrade. For more information head over to **www.thinkboxsoftware.com**

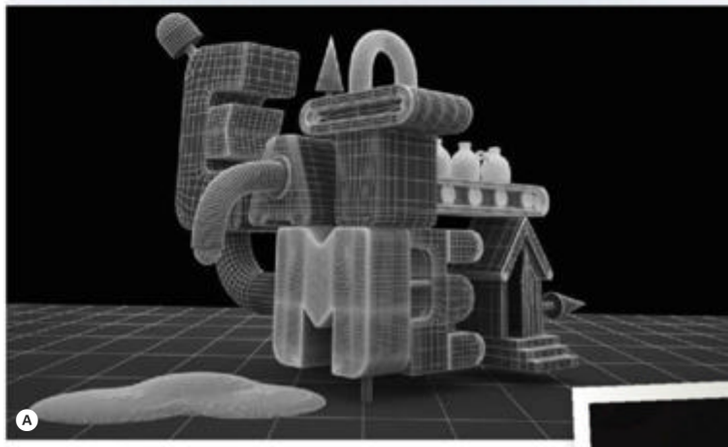
DID YOU KNOW? ▪ The Foundry has announced that its 3D digital paint tool, MARI, will be available for Mac this year

Studio Access

Finger Industries

This small but imaginative studio reveals how its tight-knit team creates unique animation designs





FINGER INDUSTRIES LTD.

Formed in 2002 in the heart of leafy Sheffield, Finger Industries produces imaginative, original animation design and works on production, pre-production, character design and illustration.

www.fingerindustries.co.uk

Vimeo www.vimeo.com/fingerindustries

Behance Portfolio www.behance.net/fingerindustries

With a portfolio made up of illustration and design as well as animation, Finger Industries aims to keep pushing boundaries with its imaginative breadth of work.

"We started up as a partnership in 2002, having seen a few examples of how not to run a company along the way, and that gave us an impetus," managing director and co-founder Marcus Kenyon begins. "All we really knew at the time was that we wanted to work for ourselves, and we wanted to do it differently from everyone else."

Having this year celebrated 11 years in the business, Finger Industries has definitely been "doing things differently" very well indeed. The studio was initially set up in a tiny space with a couple of good-sized contracts. Its earliest work included everything from an industrial safety promo to a mouse-versus-cheese-based phone game. "There's some very odd stuff back there in the archive," Kenyon reminisces. "We took on everything, all the while pushing the good stuff by doing original promotional work and getting it seen."

Finger Industries has since done a multitude of work, creating TV ads and book covers as well as original design animations such as their recent promotional motion graphics project 'The Sugary Death Machine'. The studio handles everything from illustration through to full animation production, and has worked for clients such as Lloyds TSB, Oxford University Press, HSBC and Bank of Scotland. Last summer its work on the Olympics series of Lloyds TSB illustrations was featured on the side of the Lloyds bus that followed the Olympic flame around the country. "We've always had a practical, no-nonsense approach," explains Kenyon. "It shouldn't be a mysterious and secretive art. We do a lot of explaining the process to the client and keep them comfortable with where the project is going."

One of the studio's philosophies is to see work as a craft that needs the constant input of time, practice, skill and care to make the final result a success. Kenyon describes how the studio's small, close-knit team of artists allows Finger Industries to retain their unique creativity and control. "We have no 'middle-managers' and people to get in the way of what we do," he says. "We are all aware of each other's strengths and weaknesses, but everyone has an equal say and a point of view. I think when a company gets too large that is easy to lose."

It's this flexibility, attention to detail, good communication, and an ability to work as a team that

> "It shouldn't be a mysterious and secretive art. We do a lot of explaining the process to the client and keep them comfortable with where the project is going"
>
> **Marcus Kenyon,** managing director

Contributors

Marcus Kenyon
Managing Director

Jonny Ford
Creative Director

Rachael Brown
Production Manager

Portfolio highlights

Here are some of the major projects Finger Industries has worked on:

2007-2013 *Lloyds TSB, advertising campaign*
2010-2012 *'Oxford University Press, illustration contract*
Jan 2009 – Aug 2009 *Mike the Knight, TV series design*
2011-2013 *Jack Mach, TV series*
Apr 2010-Mar 2011 *Bank of Scotland, advertising campaign*
2012-2013 *The Car People, advertising campaign*
2010-2012 *HSBC, sharesave scheme advertising*
Sept 2012-2013 *Plotr, online campaign*
June 2012-2013 *Which? Online advertising*
2011 *Seabrooks Crisps, advertising campaign*

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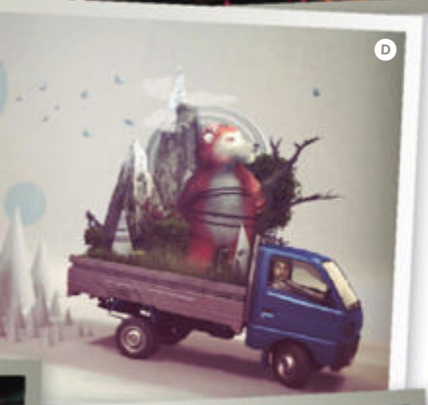

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E

3ds Max, Photoshop, and coffee

Marcus Kenyon on the software used by Finger Industries, and why organisation within management offers increased creative freedom

The main tools and software Finger Industries uses include 3ds Max (in combination with tools such as V-Ray, Hairfarm, and Royal Render), Photoshop, Premier Pro, Mudbox, and After Effects; as well as more traditional tools like pencils and coffee. The work is created to a very strict production pipeline, so being organised at a scheduling, financial, and management level is also important in the every day running of the company. "Very boring," Kenyon acknowledges, "but if you are organised and prepared it makes the creative side more enjoyable and frees you up to think and be creative."

make Finger Industries such an effective and unique studio. Complete transparency and an all-inclusive approach to content creation ensures that everyone gets to have their say. "A project may be being led by one individual, but we all see it and all comment so there's no hiding," says Kenyon. "You just take each work as an individual piece and apply what you've learned to the best of your ability – we just have a particular angle on things. Maybe we've all been in the same room together for too long!"

The team's skill has been most recently demonstrated in Finger Studios' new promotional design animation, the aforementioned 'Sugary Death Machine', which playfully explores animated typography and motion graphics design. The team began by designing and creating a CG house inspired by the witch's cottage from Hansel and Gretel. After having taken photos and HDR images of the woods near the studio, they composited the house into one of the photographic backgrounds, using this as a basis for the animation. "The house then transforms itself in a flurry of movement to reveal its true nature," Kenyon reveals.

When discussing the challenges and lessons learned after being managing director of the studio for so many years, Kenyon explains that the toughest projects are the best as they teach the most – even when they require slowly working through a problem after having become completely stuck. One of the projects he's most proud of having worked on, a short

A You can watch The Sugary Death Machine at tinyurl.com/3DASugary. The short aptly demonstrates both Finger Industries' creative and technical skills in action.

B 'Hong Kong Street' was inspired by 'Hong Kong St' by photographer Rob Payne, and was created in 3ds Max and Photoshop. The studio had no HDR for this image, so had to carefully study the light

C 'Space Peregrination' was designed as a still promotional image, with the possibility of becoming an animation piece in the future. It was one animation that the team had a lot of fun in creating.

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pilot that Finger Industries created for The Foundation/Zodiak Rights, had its own challenges to work through. "From a technical perspective it stands out as it was a perfect blend of great design, quality CG and compositing and brilliant animation. It was really fun and challenging to get right from a compositing point of view due to numerous technical issues, but the end result was lovely and very satisfying to get just right."

Another successful project was one recently completed for PLOTR, a government careers initiative for 11-18 year olds. Here, Finger Industries created more than 20 detailed landscape illustrations. "[The project] was good fun – super smooth, getting through a serious volume of work, the team working really well, and a happy client at the end of it," Kenyon remembers.

Finger Industries has a lot planned for the future, and with this in mind it has recently moved the company into a new office space. The location offers two floors with high ceilings, three balconies, and lots of light; allowing the company plenty of creative and physical space to expand into in the coming years. Within this space, Finger Industries plans to move on to large productions, mainly in children's television by focusing on the pre and post-production of fully animated series.

The studio also intends to continue its focus on advertising work, with plans to add larger scale television commercial projects to its repertoire. "This is the heart of what we do every day," says Kenyon. "Trying to make honest, original creative decisions, and trying to keep the quality and consistency while not being afraid to try something new."

> "We see what we do as a craft, in a way - this stuff does take time, practice and skill, and we put care into our work"
>
> **Marcus Kenyon,** managing director

F Image taken from Finger Industries' promotional illustration 'The Great Horse of Yarl', which was inspired by paper-folding experiments as well as Celtic mythology

G Promotional illustration 'The Romanovs'. The studio works with global advertising agencies as well as local companies they've known for years to provide well-crafted imagery for the masses

H Finger Industries has recently moved to a new, spacious office in Sheffield. The bright, airy offices are great for creative thinking, but the extra space also affords the team the opportunity to expand

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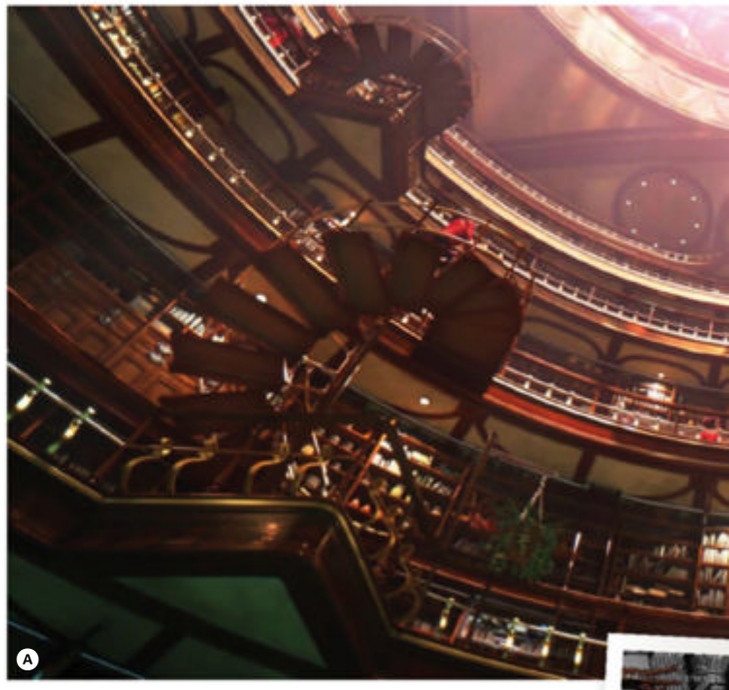
Project Focus

IGA - Aide gourmet and Petits Bouffeurs

SHED discusses the creation of its latest advert and the techniques behind character animation


A

Project 'IGA Aide gourmet and Petits Bouffeurs'

Description Aide gourmet is Shed's new CG animated advertisement for IGA, the second spot for the 2013 IGA campaign and eighth advertisement SHED has created for the company. The spot was created in Softimage and based on a script about a funny story unfolding when a client interacts with an employee. The pipeline between SHED and IGA is very streamlined after working together for several years, something clearly demonstrated by the superb technical and creative proficiency on show here.

Company SHED

Country Canada

Bio Based in Montreal, SHED is a highly creative VFX, 3D animation and post-production company bringing its expertise to commercials, film and television. Its talented artists keep pushing the boundaries to make every project innovative and visually exciting. **www.shedmtl.com**

IGA's Aide Gourmet ad is simple yet effective, showing how much knowledge an employee of the grocery store contains in their head. It was SHED, a VFX, finishing and 3D animation boutique specialising in advertising,that build the character animation and efficient pipelines to bring the project to life. "The main challenge was managing the huge layout of the library," explains SHED's Jean-Sebastien Guillemette, who worked on lighting and shading. The company faced long rendering hours, as well as difficulty managing the scene during animation due to the quantity of details it contained. Arnold Renderer's stand-ins feature was used to combine thousands of objects into a single proxy mesh within the scene, making it easier to interact with different sections of the library.

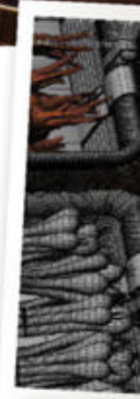
SHED also worked on new techniques within the company's hair creation pipeline during production, as Aide Gourmet required many characters to boast hair grooming and simulation. "We developed in-house tools using Softimage ICE that let us design and simulate all those characters in a streamlined pipeline," Guillemette continues, concluding that by the end of the project a single artist was able to manage all the hair within the commercial, a significant result that will no doubt be very helpful for future projects tackled by the company.

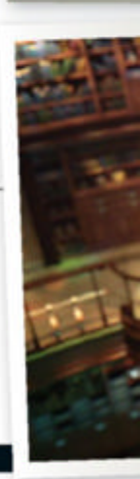
In order to properly create the impressive animation and cinematography in Aide Gourmet, SHED also developed plug-ins such as the SHED Pose Library, which were used in combination with Softimage and public plug-ins such as Motion Trail from Kato Kentaro. "Since we block the scenes and camera at the animatic level, it's easy to see what we need so we don't overdo things" begins lead of animation on the project Pierre-Hugues Dallaire. SHED's rigging process involves using a custom version of the Gear rigging toolset by Jeremie Passerin for the initial rigs, which are each later refined by hand. "We use ICE a lot for deformations, character FX

Lighting characters separately

Jean-Sebastien Guillemette, an artist working on lighting and shading at SHED describes how the company lit the characters and environments at different times in Aide Gourmet

In Aide Gourmet, the background of the animation was lit long before any of the character's lighting was created. "We do this for multiple reasons, one of them being that the camera for backgrounds are approved way before the character animations are finished," Guillemette explains. Once the backgrounds are lit, the artists focus on lighting the characters in Aide Gourmet individually while taking into account the previous lighting and look of the environment that surrounds them. Finally, Arnold Renderer in Softimage was used for rendering, as is the case in all of SHED's productions.





> "Since we block the scenes and camera at the animatic level, it's easy to see what we need so we don't overdo things" **Pierre-Hugues Dallaire,** Lead Animation

A "We are a small group full of great, talented people who are really passionate about CG. Our 3D department consist of 14 artists and in total we are around 30," explains visual effects supervisor Sylvian Lebeau of SHED's close-knit team.

B Having a library of assets is key to a streamlining production. "We reused the fruit and vegetables area of the grocery store that we created for an older commercial we did for IGA," says SHED's visual effects supervisor Sylvian Lebeau.

Contributors

Sylvian Lebeau Visual Effects Supervisor

Mikhail Semionov Lead Modelling

Isabelle Mainville Lead Texturing

Pierre-Hugues Dallaire Lead Animation

Guillaume Pelletier Lead Technical Animation

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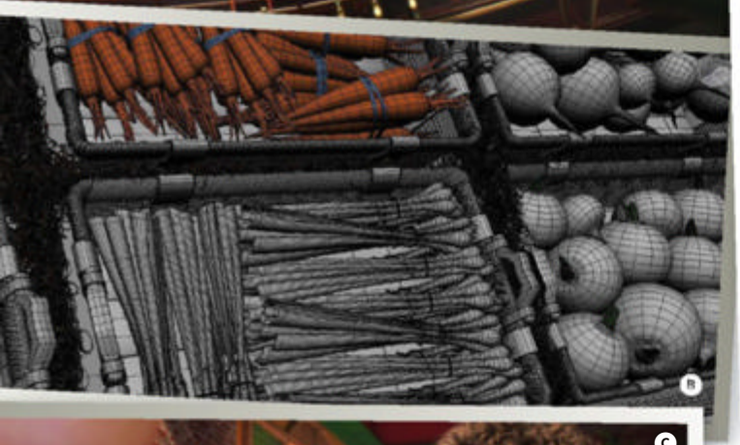

and facial rigging," says Dallaire. "Another tool that we use to transfer the animation to the rendering and simulation department is Alembic Crate from Exocortex."

It was a relatively small team that created the animation, with SHED's 3D department consisting of only 14 artists. The process begins with a rough 3D animatic that simulates the initial storyboard. "At this point our characters don't usually have a facial setup, so it is pure body language. We mostly use this time to set the cameras and compositions. After client revisions, we move on to our first true blocking pass, with clear character poses and expressions!" says Dallaire.

Once the initial animatic is completed, the artists at SHED begin to really let their characters act, adding subtle detail and movements. However, they still focus on keeping the animation simple, communicating the acting in the most efficient way possible. The animation will later be revised, keyed, and perfected before it is completely finished and approved. Once finalised, extra video references will be shot if needed, and a week or two later the final animation is complete. "We just hope the client likes it," Dallaire says. "Revisions are much harder to do at this point!"

C "I think this is about the eighth advert we've done for IGA, and we've had a lot of education concerning how 3D works in the past few years," says Lebeau of SHED's working methods. "As such, our pipeline is quite streamlined by now!"

D "From time to time, when the environment suits it, we will render a panorama of our CG background to use as an HDR image to support the character's lighting," says Jean-Sebastien Guillemette, who worked on the lighting and shading for the project.

E "At SHED we try to have the best possible work environment for artists to have great fun and also feel comfortable," says Lebeau. "The studio is an open space which helps everyone when exchanging ideas and solving problems that crop up."

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Industry insider

Stefano Tsai

Stefano Tsai, senior 3D artist

For Stefano Tsai, taking a design from its initial concept to a beautifully finished virtual world in a few hours is just part of the job...

About the insider

Job Senior 3D artist and concept designer, currently working for The Creative Assembly Ltd, Sega

Education BA in Fine Art

Website www.stefanotsai.idv.tw

Biography Tsai is a UK based concept designer and 3D artist with over ten years of experience working within the CG industry. He is currently working on a new exciting Alien IP at Sega, with his main focus being on the 3D pre-visualisation of environments and mechanical assets.

Having recently worked on a new major game in the Alien franchise and with more than ten years experience in CG for both the games and entertainment industry, Stefano Tsai remains very excited about future projects. As a senior 3D artist for Sega he specialises in the pre-visualisation of environments and assets, so taking a futuristic spaceship from its initial concept to a full realistic CG model and design is his speciality. 3D pre-visualisation requires a huge amount of research into everything from the type of materials that could be used for the asset (with reference to real world materials used in similar objects), to the lighting and artistic style of the final piece of work. Extensive technological expertise is also a requirement, particularly for Tsai, whose focus is on modelling futuristic mechanical machines and environments. These objects don't actually exist, but his work needs to look so realistic that audiences feel like they could. "I love sci-fi and fantasy a lot because we don't have it in the real world," Tsai explains. "3D gives me an easy way to get closer to my virtual world, and modelling is the first step."

Can you tell us about how your first got involved with the world of 3D art? What were you earliest experiences as an artist?

I first got involved with 3D art back in 1999. My father bought me a 3ds Max 1.0 book in my second year of university, and I spent the whole of my summer vacation with that book and my computer. The three-dimensional world really blew my mind. It was first time I could create anything in my own world and be the director of my own set.

What elements of 3D excite you most, and what tools and software do you find most useful?

I love sci-fi and fantasy a lot because we can't have it in the real world. One of the elements of 3D that excites me the most is imagining a virtual world that is half way between dream and reality. I have used 3ds Max for more than ten years, and have found the modelling process to be the easiest for creating these worlds and the mechanical elements within.

Can you please discuss your workflow, and how you go about building the mechanical images that you create?

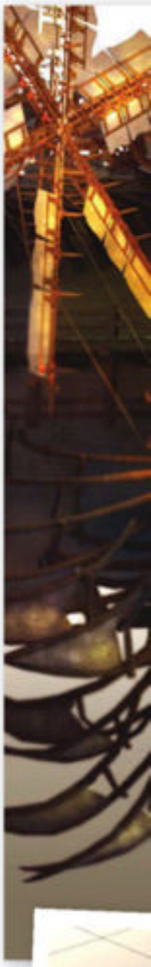
Normally I start by researching the technology I want to use and organising the references needed for the project into folders. They can be separated into structure, materials, lighting, art style, and so on. With my most recent personal project, product design 'Enforcement Vehicle', a work utilising an initial concept of a bike by Bradley Wright, I took Bradley's concept as an outline and filled in the details using the references I had found.

To model Bradley's bike and make its structure believable, I had to decide what type of equipment I would need for an electronic bike with a non-petrol engine, and model a main hull that would allow these components to be installed and fitted into it.

After I had completed modelling, lighting, and rendering in 3ds Max, I opened my render in Photoshop to adjust the level, contrast and colours. This can help the image to look less '3D'.

What does your role as an artist at Sega entail?

The core challenges are to create whatever lead artist Jude Bond or group lead artist Mark Radcliffe want in a short amount of time, and provide the best solution for art or game play. Sometimes I might only have a few hours to complete the task. 3D is very helpful for something that needs to be more systematic. Objects can be copied and modified easily. It's a very advanced tool for the visualisation of a virtual world.



Portfolio highlights

Some recent features that Stefano Tsai has worked on:

Present *New Alien IP for Sega*
2011 *Total War: Shogun 2*
2010 *Napoleon: Total War*
2009 *G-Force, Disney*
2007 *Unannounced PlayStation3 project*

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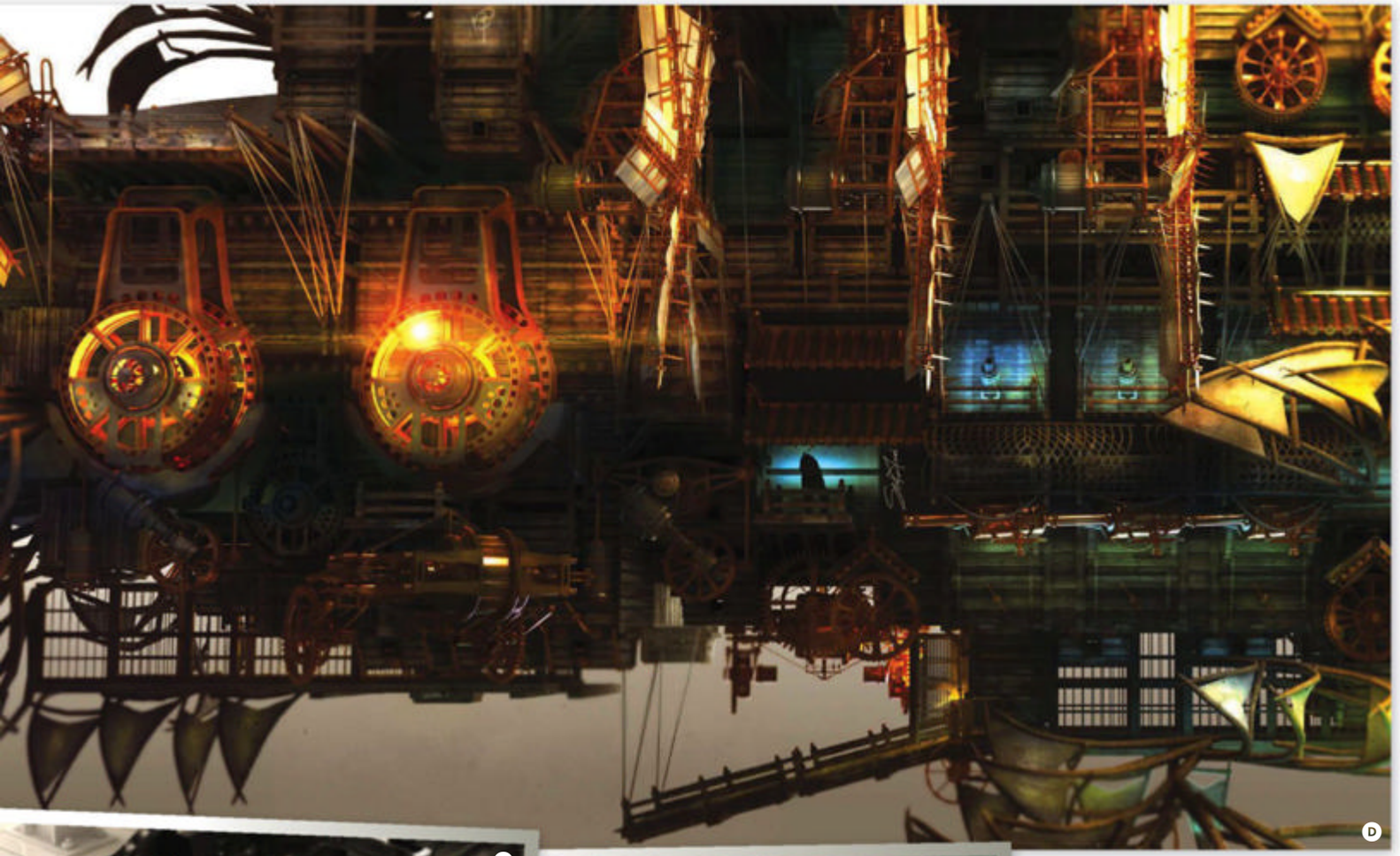

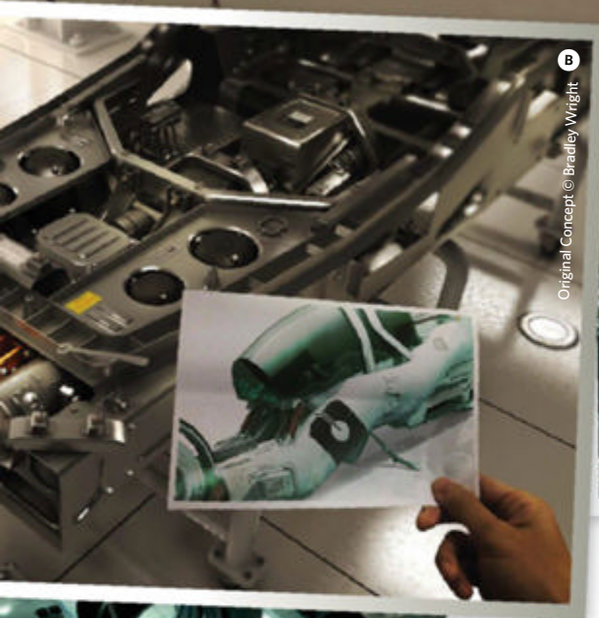

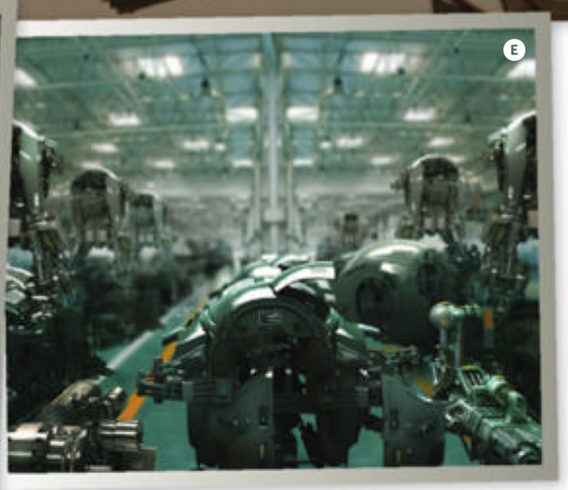

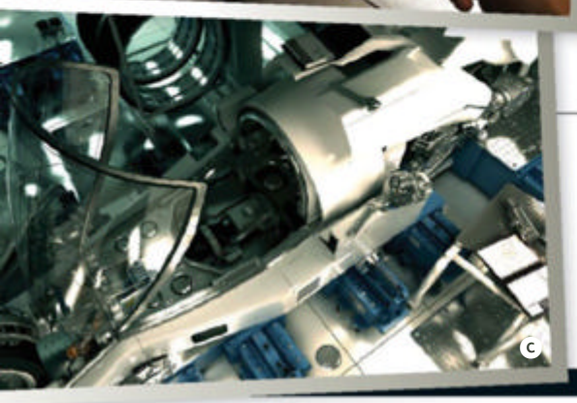

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Stay humble & keep learning

Tsai advises new artists to trust their instincts, follow their passions, and to keep remembering that it really is easier said than done

"The more you explore, the more you feel humbled. Feeling humble keeps you learning and moving forward. Have an open mind and set a goal, then work towards it diligently and passionately. If you don't like it, don't waste your time. You should just change your target and move on."

> "One of the elements of 3D that excites me the most is imagining a virtual world that is half way between dream and reality"

A Building complex virtual worlds is no easy task, but common tools such as 3ds Max make it a much easier task for videogame developers

B Whereas sci-fi used to be about aliens and lasers, a recent trend has seen a harder brand of sci-fi come to the fore, boasting more realism

C Stefano prefers to work on lighting alongside modelling during his workflow, to see how the asset will look in the final stage of production

D 3ds Max isn't just a useful tool for building worlds, it can also be incredibly helpful for simply sketching out rough, early concepts

E Stefano says 3D work can look fake if it's "too perfect". That's where Photoshop comes in – to add "grittiness and the human touch"

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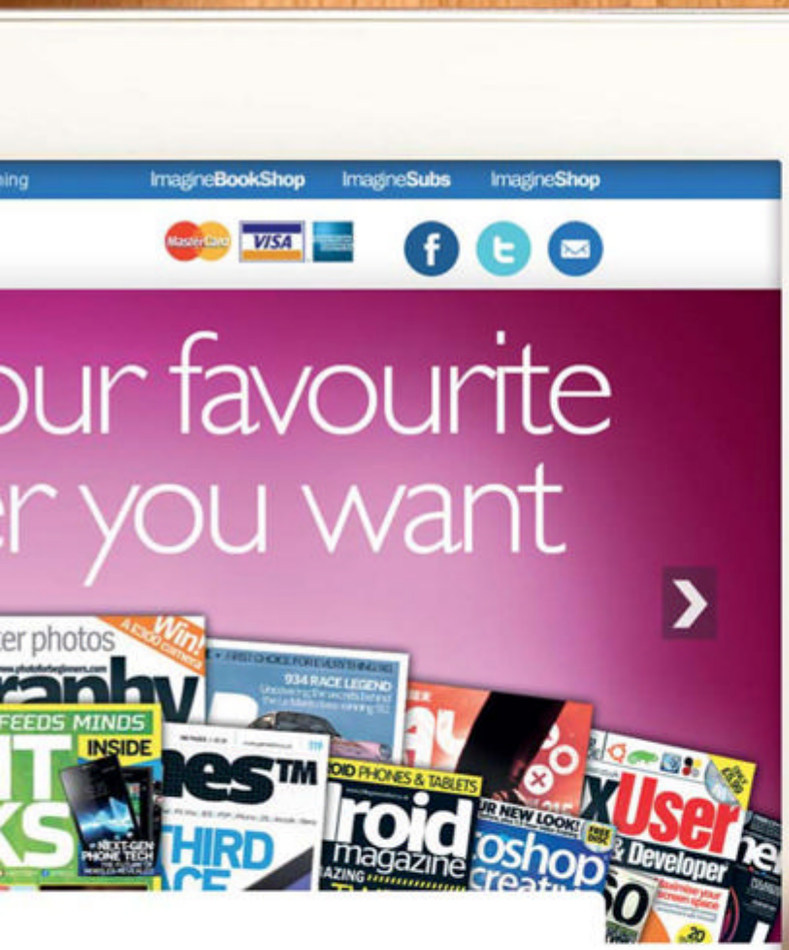

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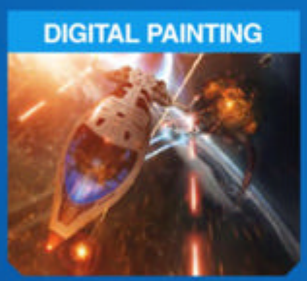

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